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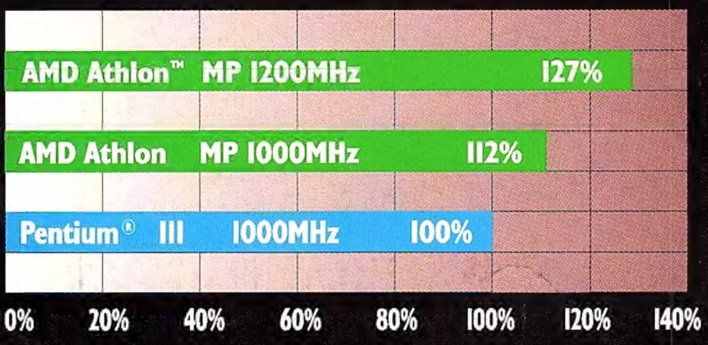

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AMD Athlon™ XP Processor Performance Benchmarks
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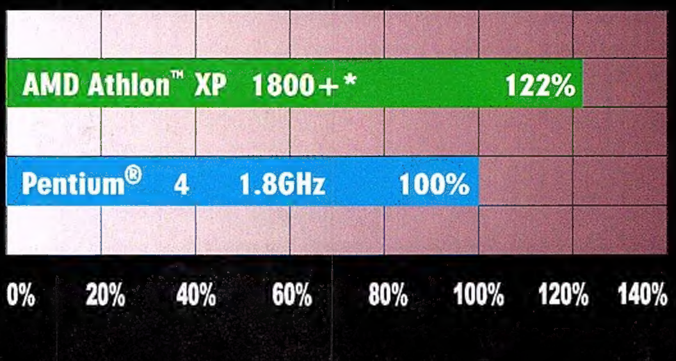

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ATOMIC CONTENTS

NEWS 08

Technica Obscura: The paradigm of interface 12

Z-Access: Show me to my slide rule 14

Ground Zero: Unconventional wisdom 16

HOT BOX 18

The freakiest case mods ever known to humanity.

X-RAY: PLATTERS, HEADS AND SLIDERS 22

We demystify the wonders of the humble hard drive.

HEAD TO HEAD: CLASH OF THE MONITORS 26

CRT: Reliable, affordable and really bloody heavy

LCD: High tech, expensive and light as a feather

FEATURE: XBOX DEFLOWERED 28

Atomic got its mitts on the first Xbox in Australia.
Then we proceeded to rip it to pieces.

FEATURE: ONE MOFO OF A MOBO ROUND-UP 36

The Athlon has a powerful chipset in VIA's new KT266A.

I/O 74

Problems go in, answers come out. Just the way you like it.

TUTORIAL: TRIPPING THE LIGHT FANTASTIC 78

Build the ultimate in custom caselighting shows.

POST APOCALYPSE 84

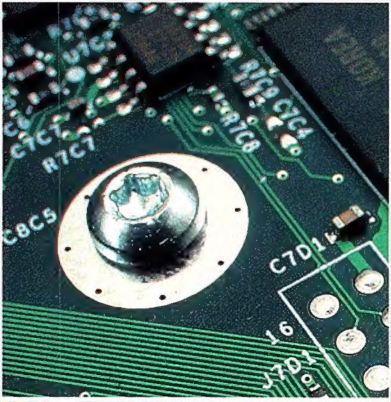
Another month, another 47,632 readers' letters.

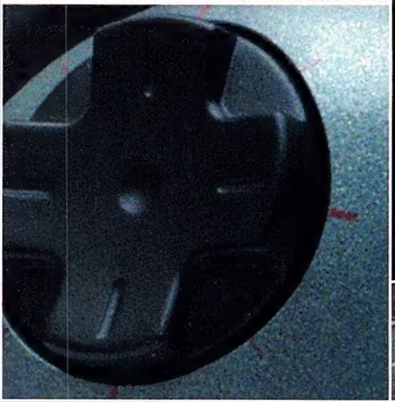
SUBSCRIPTIONS 68

Maybe win a Radeon 8500 or Radeon 7500. We kid you not.

FALLOUT 98

The future of stuff.



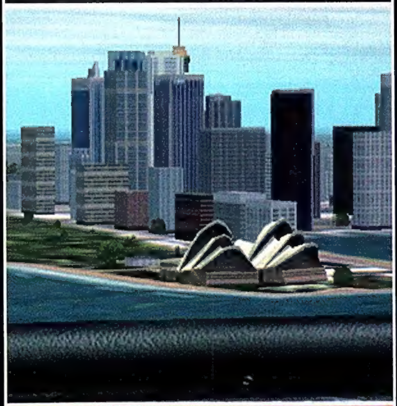


REVIEWS 42
Atomic benchmarks 44
MSI 645-Ultra motherboard 46
Hercules Prophetview 720 47
Sony DCR-IP7 Network Handycam IP 47
Seagate Cheetah X15 36LP 48
Cooler Master HHC001 48
Bitspower NP80D HSF 50
Logitech MouseMan Dual Optical mouse 50
NaturalPoint TrackIR 52
Maxtor D740X-6L hard drive 52
Toshiba Tecra 9000 laptop 54
TDK S150 Tremor speakers 54
Belkin n50 Nostromo SpeedPad 56
DVD Region X 56
Bravura Radeon 7500 Evil Master 57

GAMES 58
SmackDown! Just Bring It 60
Ghost Recon 61
Sid Meier's Civilization III 62
Flight Simulator 2002 64
IL-2 Sturmovik 65
Grand Theft Auto 3 66
Real War 67
Alien vs. Predator 2 69
World War III: Black Gold 70
Stronghold 72
NHL 2002 73

COMPETITIONS 87

We've got far too many cool prizes to list in this tiny space.
So head to page 87 right now.
See what we're mad enough to be giving away this month.



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Great covers

One is pretty golden. Atomic 1 was a brassy chuck in the pan of computer mags. One year old and Atomic is IT.

Not that we're in any way surprised. Computers are hell cool, and Atomic is pure computer love – done nicely, but hard and fast, and always pretty to look at.

We know why you like Atomic; it's for the same reasons we do, and that's why we won't go changing the dream and the spirit, now, or ever.

Atomic instantly drew a certain kind of person. Many, loving what they saw; some, legitimately raising concerns, posted their thoughts on our forums, which are part of our site, which was launched the same day Atomic one went on sale. Most of those people are still on the forums, and many of them are Heroes.

Atomicans rock. But you know that. We're a pack of friends tens of thousands strong. The M337s, the LANs, the BBQs, the parties . . . All around Australia and over the sea to NZ, Atomicans gather. Drawn by passion for the same thing – being part Atomic itself, but mostly what Atomic is and stands for. It's a beautiful thing and we're far from un-moved by it.

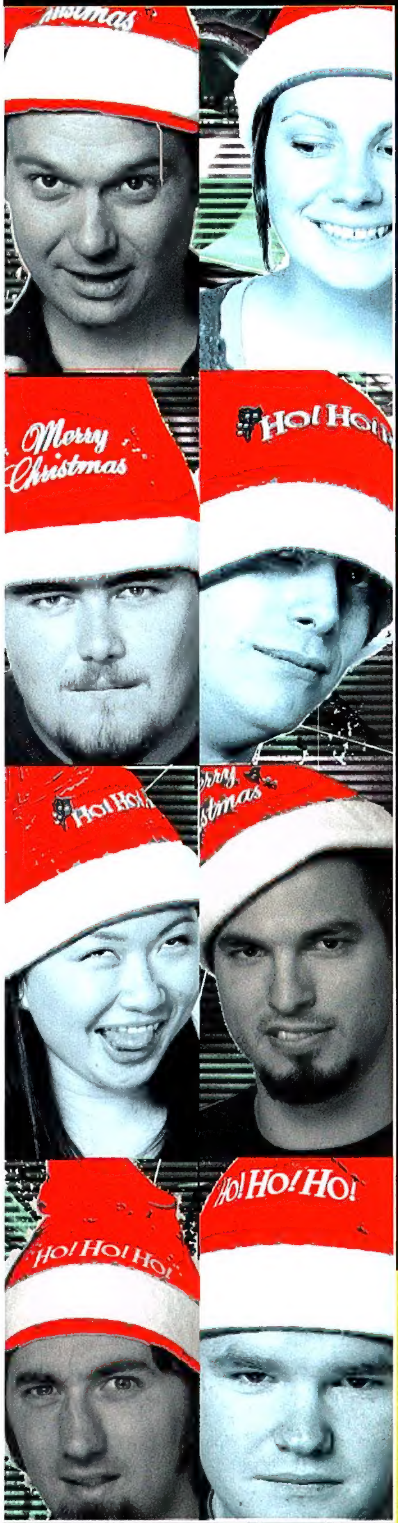
The future will have the same shocks and wonderful revelations. From the industry that supplies us all with the good toys we love, then from Atomic, as we screw with things in ways not intended. We void warranties. Joyfully.

A special shout to our 'opposition'. Atomic was a shock to the other IT mags and their attempts to flatter us by imitation – and occasional dirty tactics – has amused us and strengthed our resolve. No-one benchtests like Atomic, because no-one else understands how to.

There's no room to properly thank everyone that got us this far, but to all of you – staff, contributors, artists, PR bunnies and you. We are Atomic.

Ben Mansill, Editor

PS: The spunks on the right are Atomic HQ staff. Ph3ar us.


Merry Christmas
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MAXIMUM POWER COMPUTING

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Atomic welcomes all information on new and upgraded products and services for possible editorial coverage. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. The editor welcomes ideas for articles, preferably sent in outline form, with details of author's background and samples of previously published work. We cannot accept responsibility for unsolicited copy and stress that it may take time for a reply to be sent out.

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Short Circuits

By the time you read this, Australia's largest capacity fibre-optic link should be ready for commercial use. Weighing in at 640Gb/s, the 12,000km cable links Australia to Asia and will provide major shareholders, one of which is Telstra, with even more international bandwidth capacity. Now if only they could finally get their act together with consumer-level broadband.

Bleem, the company behind the well-known PlayStation and Dreamcast emulators of the same name, is dead at the young age of two.

Speculation about cause of death is rife, but major factors include money (or lack thereof) and future direction. Despite the huge amount of publicity and brand awareness brought about after Sony sued Bleem (twice) for copyright infringement, several factors contributed to make Bleem's future hazy at best. With Sega dropping the Dreamcast, ongoing legal costs in its battles with Sony, and the certainty of lawsuits from Nintendo and Microsoft had Bleem attempted to support consoles from these companies, Bleem was between the proverbial rock and hard place. RIP Bleem, we'll miss you.

Eleven NVIDIA employees are facing charges of 'insider trading' after it was revealed they used prior knowledge of NVIDIA's Xbox contract for financial gain. When the company sent an email to all employees announcing the win, 11 NVIDIA employees (most of whom were engineers) proceeded to buy NVIDIA stock, which more than doubled in price after Microsoft's official announcement four days later.

Comdex Fall 2001

The Taliban managed to do something no woman ever has – keep a bunch of geeks away from one of the world's largest tech expos. While there weren't exactly tumbleweeds blowing down the Vegas Strip, it was very quiet at Comdex Fall 2001.

Despite organisers Key3Media trying to put on a brave face, the reality was that Comdex was a shadow of its former self. Exhibitors and attendees were dramatically down from previous years; a fact that did not go unnoticed by everyone from the show's keynote speakers to the Vegas cab drivers who were left waiting for paying customers.

However, the biggest letdown of Comdex was the obvious lack of showstoppers. While there were strong product showings from many US, Asian and European companies, not one jaw-dropping product stole the show. The usual suspects were there, of course, and they were the ones making the biggest noise.

It goes without saying that Microsoft and its partners owned Comdex in terms of floor space. The Microsoft Partner Pavilion had literally hundreds of booths filled with hardware and software developers showing off all the latest products, services and solutions for XP and .NET.

Big Bill did a keynote speech. However, his decision to not run around whooping like a monkey during the opening phrases ultimately hurt its impact; it was decidedly boring.

For many at Comdex the hunt for the 'KA' lead them to something called DoCoMo. Straight out of Tokyo, NTT DoCoMo was making a rather fuzzy claim for the most interesting product for its next generation of 3G/mobile phone devices with its latest FOMA (Freedom of Mobile Multimedia Access) video-mobile phone.

The service, dubbed 'i-motion', will eventually enable you to obtain video content at speeds of up to 384Kb/s (64Kb/s uplinks) from sites accessed via DoCoMo's official 'i-mode' portal, with i-motion-compatible FOMA handsets.

Content such as movie trailers, news highlights and music files will be among the many types of rich content to be offered. You can also pick your data of choice: video with sound, still frames with sound and normal music files. This means you can stream Britney onto your phone and watch her – which is a good thing. Even better is, you can get her without any sound – this is 300% fun.

Wireless devices in all their guises were really the thrust of the show, and while this next-gen technology is interesting in places, it does not set loins alight.

Traditionally, the booths with smaller countries are where you can find some interesting and sexy (crazy) gadgets. While some of these may never see the light of day, they lighten your heart with the knowledge that mad professors still exist.

Unfortunately, all the world's mad professors for some strange reason decided that November wasn't the best month for international air travel, and so failed to put in appearances. That made for an altogether duller and more corporate show – which just isn't Atomic. We can only hope that next year's show makes up for this year's dud.

Simon 'Cheeky Monkey' Corbett

Atomic WorldLAN GibFragCON: XP

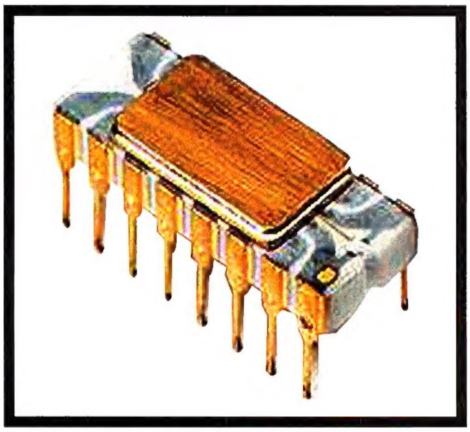
Organisation for the Atomic WorldLAN GibFragCON 97: XP is in full swing, with MAD_MAN_MODZ, mael, Gramyre and others labouring day and night to bring you the best darned LAN this side of, well, anywhere. Atomic is also working hard (no, seriously!), helping the Melbourne and Sydney crews coordinate and arrange prizes, competitions, sponsors, and other fun and interesting things. While the LAN will absolutely rock, we will be raising a great big pile of cash for the MS Society of Victoria at the same time. Definitely a worthy cause.

We're also happy to announce the WorldLAN GibFragCON 97: XP site is now online and operational. Not only can you register your interest at this fine example of Atomic HTML |337ness, you can also gain access to such valuable information as maps, where to park, a floor plan of the building, and where you can go when the hunger pangs overpower the game cravings. The site is accessible via a link on Atomic's front page (www.atomicmpc.com.au), so, if you're yet to register your interest in the WorldLAN GibFragCON 97: XP, do so now. Or else.

The microprocessor turns 30

It was a joyous occasion for hardware geeks everywhere late last month when the microprocessor turned 30 years old. The world's first microprocessor was the humble 4004, built by little-known company INTegrated ELectronics, which later grew up to become chip-making behemoth Intel.

Boasting 2300 transistors squeezed into a 12mm^2 area, the 4004 was capable of an astounding 100,000 operations per second. The chip's instruction set comprised a grand total of 45 commands, which is quite a lot when you consider that the 4004's main function was to perform simple addition and subtraction operations.



Notice the very '70's wood grain-style finish.

Despite being officially recognised as the world's first microprocessor, there are those who contend that it was in fact the second. The Central Air Data Computer (CADC), developed between 1968 and 1970, was designed for use in the F-14A fighter aircraft. The main function of CADC was to coordinate control surfaces, such as ailerons, while the F14 was in flight. Unfortunately for the designers of the CADC, national security issues meant that word of the chip wasn't leaked until early April 1998.

CADC aside, the fact remains that it was Integrated Electronics' 4004 chip that started the revolution.

First used in calculators made by Japanese company Busicom, the 4004s are now a rare sight. However, if you absolutely must own one of these beauties (imagine the kudos that would come with ownership of a 4004 keyring), there are still a few chips floating around.

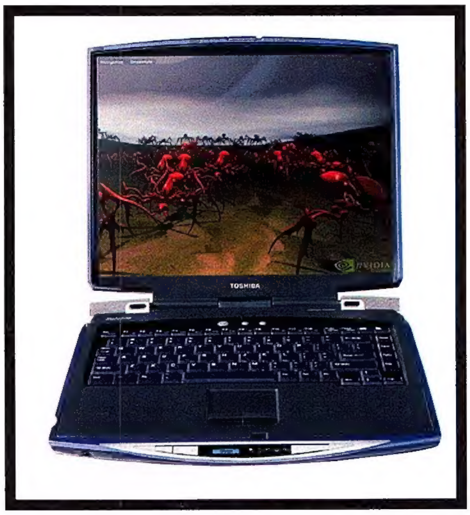
On the road again

Around this time last year we were getting excited about the announcement of NVIDIA's GeForce2 Go chipset for notebooks. Finally there was a light at the end of the crap notebook graphics tunnel, and all and sundry were looking forward to light and compact LAN gaming on their work notebooks.

The GeForce2 Go hit, and it was good, but this year's Comdex showed that it is only the beginning, with the true revolution now well and truly underway. The cause is NVIDIA's announcement of the NV17M, a new mobile chipset. This beast is no GeForce3, but it comes damn close, with a programmable hardware T&L engine, a speedy 250MHz core speed, 64MB of RAM running at 250MHz (500MHz DDR), TwinView support, hardware MPEG-2 decoding for better DVD playing and NVIDIA's PowerMizer technology.

This chipset has the potential to wipe the floor with anything else in the mobile market, and a lot of the desktop market as well. The NV17M also comes in NVIDIA's new Mobile AGP Package (MAP), which squeezes the GPU and the RAM onto one small double-sided package, which is the size of a normal GPU.

We don't yet know when we will be seeing the NV17M in production (by which time it will have a suitably tacky name like LapForce), but rest assured if NVIDIA does manage to deliver mobile, gaming will never be the same again. In a good way, of course.



NV17M: now with new Ant-Aliasing.

Short Circuits

Researchers at the University of Nebraska-Lincoln have managed to create the world's first plastic magnets. The organic polymers in question are large chains of carbon-based molecules. By chaining together 'larger and larger molecules with different arrangements of unpaired electrons', the researchers were eventually able to produce a chain that displayed magnetic properties. Unfortunately, the plastic magnets are not yet ready for use in novelty fridge stickers, as their magnetic properties are only stable when held in an oxygen-free environment at 10 Kelvin.

SafeWeb, a popular free Web proxy from the company by the same name, has shut down its public proxy service.

The publicly stated reason for the closure was a shift in SafeWeb's focus towards the corporate market. This further narrows the options available for those who like to maintain their online privacy.

Other similar services are also feeling the pinch. Freedom Network, a company offering a more integrated privacy solution that touted data encryption as one of its advantages, closed its free service earlier this year after it too underwent a shift in focus towards products for the enterprise market.

As far as we can ascertain, this leaves the Anonymizer service (www.anonymizer.com) as the only free service of its kind. At a time when the country routing a majority of the world's Internet traffic (America) is passing increasingly more Draconian and invasive laws, services such as SafeWeb and Freedom Network are needed more than ever.

Short Circuits

Sick of mobile phone users who refuse to switch off in places such as restaurants and cinemas, a Hong Kong-based company has converted military jamming technology into a device capable of jamming mobile phone signals. Called MuteTone, the device is capable of jamming areas up to a maximum of around 2,000m^2 and will retail for approximately $US1,600.

Unfortunately, there are several potential legal issues tied up with use of the device, so it may be a while before you can buy MuteTone in Australia. Still, if you absolutely must have a MuteTone, you can always grab one next time you're in Hong Kong.

The Atomic Spy Ring had a rather good haul this month. Among the many interesting tidbits that were picked up and forwarded to Atomic HQ, was that a certain video card manufacturer has established a 'front' company to manufacture ATI-based graphics cards without attracting the ire of current industry darling, NVIDIA.

The fact that a company has to participate in such cloak-and-dagger measures to sell a product just goes to show how entrenched NVIDIA is as the current king of the graphics chipset industry.

To protect the innocent, the not so innocent and the downright guilty, Atomic will name no names. Potential Atomic Spy Ring subversives please note: Atomic: Maximum Power Computing will fully protect the identities of those who wish to forward us certain tasty bits of information. So if you feel the need to forward us any information you shouldn't really know, go right ahead!

DNA computers

Scientists from the Weizmann Institute in Israel have created DNA-based computers capable of totally autonomous operation. Currently, the DNA computers are only capable of answering simple 'yes' and 'no' questions.

Using strands of DNA for software and input, as well as two naturally occurring enzymes for hardware, a trillion of these machines are capable of producing 10,000,000,000,000 calculations per second, with an accuracy of 99.8%.

Programming of the DNA computers is carried out by choosing the appropriate combination of molecules on the software DNA strands.

After programming is complete, the DNA and enzymes are mixed together. The enzymes then process the input DNA, cutting and restructuring it according to instructions coded into the software DNA strands. Consuming less than 10^{-10}W of power while processing, the eventual output is a molecule that carries the answer to the original yes/no question.

DNA computers are not new. There have been several previous attempts at creating DNA-based computers, but all have resulted in machines that must be closely monitored and manipulated during every step of their computational process if a correct result is to be obtained.

While this new method of DNA computing brings the technology into the realm of 'shake and bake', there is still a lot of research to be carried out if DNA computers are to reach their full potential. The most promising applications, such as synthesis of drugs within the body, are still tens of years and millions of dollars away in research.

Censorship is flavour of the day

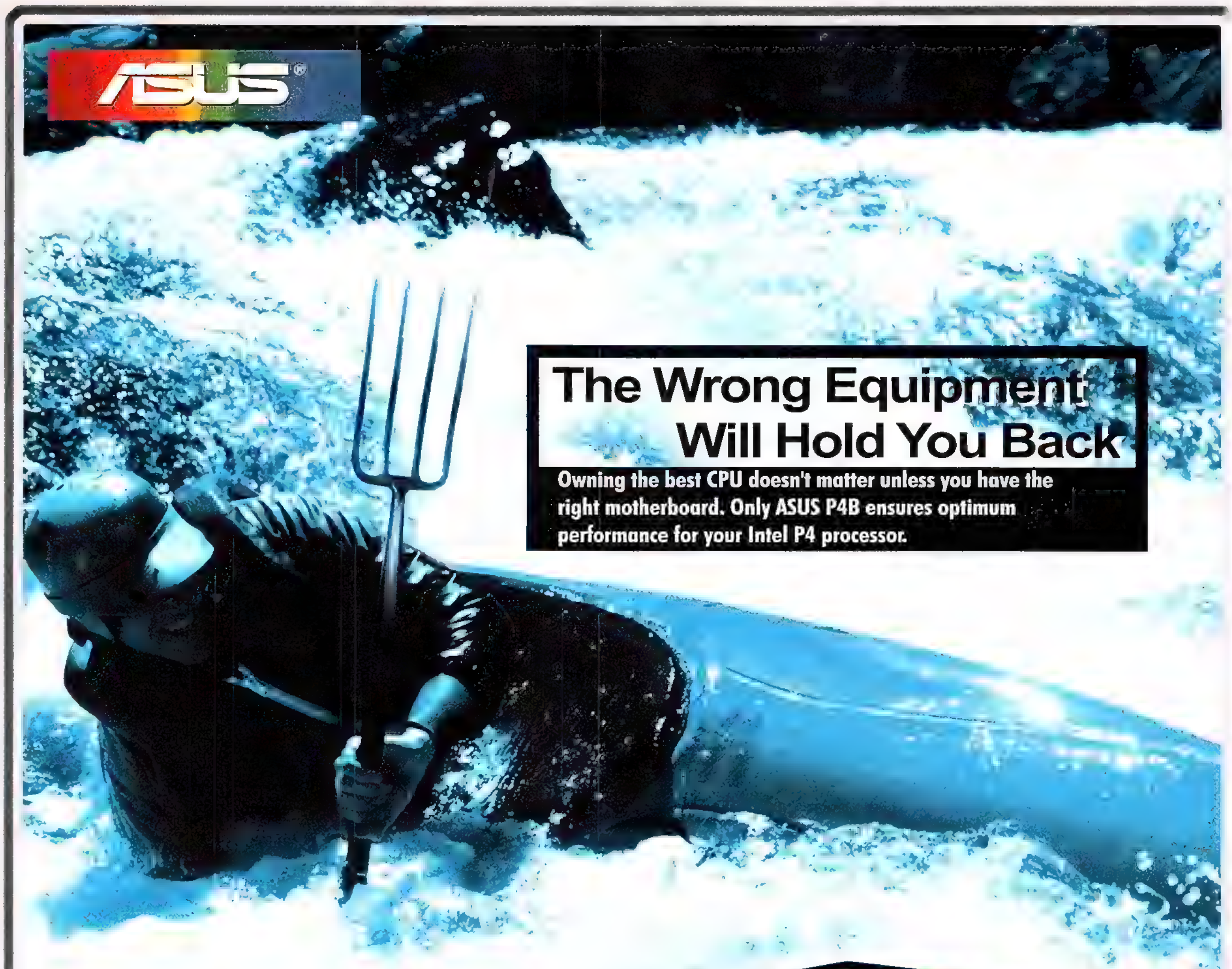
Would-be censors around the world are growing bolder in what they opine we, the great unwashed, should and should not view online. China recently shut down over 17,000 Internet cafes for 'failing to filter subversive content'. Chinese officials place several strange choices into the 'subversive' category, including 'foreign news services'. Perhaps communism wasn't the best choice after all.

Communism may not be the answer, but the American version of democracy seems to be faring no better. Flying in the face of all that the world's last superpower allegedly stands for, the American Government has given itself power to prosecute foreign 'hackers' who attack non-US-based computers if any part of said attack passes through the US. Since the majority of world Net traffic does in fact pass through the US at some point, this gives American authorities unheard of powers. Atomic can see the headlines now: 'French hacker cracks Australian-based Web server – arrested by FBI as terrorist'.

The situation is only slightly better on the home front. Proposed new NSW legislation will make uploading content to the Net that is 'unsuitable for viewing by minors' illegal without the employment of approved protection schemes.

The meek may inherit the Earth, but ignorant Luddites in our governments are the ones in power. Until people 'wake up and smell the Java', as it were, this erosion of our online rights and freedoms will continue.

What's HOT	What's NOT
■ **AMD 760** A fond farewell to the original DDR chipset	■ **VIA KT266** Thankfully, its reign of mediocrity is over
■ **Sid Meier's Civilization III** Magnificent	■ **Civilisation** Why can't we all just get along?
■ **Christmas parties** The stupid hat season is here	■ **Political parties** Another three years of ambivalence
■ **DNA computing** Quicker than you can say 'deoxyribonucleic acid'	■ **RNA computing** Only half as good
■ **Summer** Time to crank up those case fans	■ **Winter** Not hot at all



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The paradigm of interface

Ashton Mills imagines a future desktop – a future without a Start button.

> **'What about now? With current technology, is there a better way to interface with your PC?'**

Let me ask you a question: with all the wonderful advancements in computing over the years, what's the one area that has hardly developed at all, almost since the inception of personal computers themselves?

It's right in front of your face – the interface. Xerox gave us the mouse and the WIMP (Windows, Icons, Menus, Pointer) paradigm, Apple refined it, and Microsoft made it mass market. But in all these years since the inception of the concept in the 1970s by Xerox, essentially, it hasn't changed.

So another question: is the WIMP interface that we've been using for 30 years now really the easiest, most efficient way to interact with a computer? Sure, we can see a future filled with glove input devices; tailored, textured keyboards; perhaps a 3D interaction with the desktop of some sort through images beamed directly onto the eye – but that's all in the future, and it's not something we *know* is going to be easier or more powerful. We just think it will because it sounds so damn cool.

What about now? With current technology, is there a better way to interface with your PC?

One Tuomo Valkonen, author of a new in-development Unix-based 'window manager' (that is, GUI) called Ion, thinks so. The premise behind Ion is to do away with a cluttered desktop filled with overlapping windows controlled via a mouse. Rather, the desktop is divided into frames (much like what you see on some Web pages), which never overlap, and all of them are controlled through keyboard shortcuts.

The idea is fascinating. Though Ion is for Unix systems, imagine a similar implementation for Windows. No more moving that Word window to get to Winamp, or minimising your browser window to find the Explorer window you opened. You could run applications across virtual desktops, all of which are always visible and take up their allotted space on each desktop, and all of them selectable at the touch of a key.

I always find myself browsing the Web with multiple full-screen browser windows, and using the Taskbar to switch between them – the 'window' paradigm is hardly needed. Full-screen application switching would do me fine, and I don't need a taskbar when a simple key combination will do.

Ion isn't the first to push the boundaries of interface design. Enlightenment, Window Maker and Black Box – all open source window managers for Linux – have redefined the interface.

Enlightenment, by Australia's own Rasterman, is still the coolest GUI you'll ever see, though it's not necessarily any easier to use than a standard Windows desktop. It's filled with sexy features such as animated desktop effects, huge theme configurability, the icon box, and desktop dragging (think pulling the top of your desktop down to reveal another underneath, and leaving the screen half-half if you wish).

Window Maker, based on the NextStep interface, does away with concepts such as a taskbar and start menu. Programs are launched from a mouse-activated desktop menu, and running applications are 'docked' together on the desktop.

Black Box takes the minimalist approach even further and does away with icons entirely. The only feature onscreen is a thin status bar and clock. Programs are launched, as in Window Maker, from a mouse-activated desktop menu. Surprisingly, it's very easy to use, and the look of its themes can put other window managers to shame.

So what about Windows? You can replace Explorer.exe with a replacement shell, but there isn't a large variety available, and most of them will cost you money. The best and most unique of these programs is Talisman.

Talisman is interesting in that it allows you to not only build themes for your desktop, but to build the desktop itself. You don't have to stick to the usual start bar/taskbar methodology, and many Talisman theme authors haven't. Some themes shift menus to buttons located on the desktop, or use two taskbars to show running programs and program launchers respectively. Interestingly, there are even Enlightenment and KDE themes that copy the Enlightenment and KDE interface from Linux! Talisman's flexibility is a very welcome change to the now ageing start bar phenomenon.

But all of these make use of the WIMP paradigm. Ion is something new. It will be interesting to see the desktops of the future, if indeed there will be 'desktops' at all.

Links-r-us

- **Ion for Linux**
  www.students.tut.fi/~tuomov/ion
- **Talisman for Windows**
  www.lighttek.com/talisman.htm

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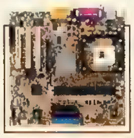

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Show me to my slide rule

The square of the hypotenuse is equal to the sum of the square of the . . . something . . . something.

'I was recently digging up some tech docs from ATI regarding the new Radeon 8500, and I came across the gear about Truform.'

Mathematics rocks. It's a darn pity I suck so much at it. It's also a darn pity that no-one bothered to tell me that maths rocked so much back in high school. Maybe I would have cared enough to listen occasionally in class, and it would have meant I wouldn't have had to relearn so much just to be able to read a press release from NVIDIA or ATI.

Don't get me wrong; Maths in Space was fun, even though it was supposed to actually relate to the real world, and it has left me unfortunately unprepared for the sheer numerical onslaught I face on a daily basis – and white papers are only one aspect of this arithmetical challenge. For the life of me I still can't figure out how much I owe people when myself and a few mates put in for a couple of pizzas, a half-case of ale and a vid. Fully, I feel like the bill should be multiple choice: Tim ate three of eight slices of the pepperoni pizza, and two of six slices of the gourmet Sicilian with extra anchovies (which cost $2 extra), and had two pieces of garlic bread and four beers, and he put in $16 in total (and repeat with multiple variables for each participant). Seriously, algebra schmalgebra – you need a Cray to figure that one out. Anyway, I'm getting off track here . . .

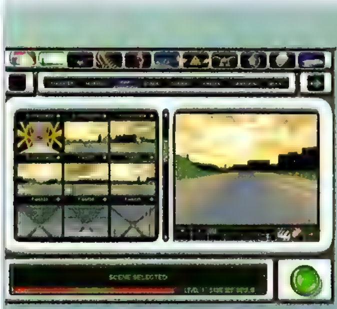
I was recently digging up some tech docs from ATI regarding the new Radeon 8500, and I came across the gear about Truform. On the surface (there's actually a pun there), Truform basically takes a low polygon model and adds additional triangles to the mix to smooth things out. This is a good thing for a variety of reasons. First of all, and most obvious, is that it makes 3D objects look better. Try making a sphere with only a couple of dozen triangles, and it doesn't really look like a sphere. The second reason why Trueform is good stuff is that simply increasing the number of triangles in the gameworld through conventional means places additional stress on the memory bandwidth, which, as you might have heard, is a big issue with the latest graphics chips. Essentially, using conventional methods, every triangle consists of three vertices, or corners, and one or more normals, which are vectors that extend perpendicular to a surface. The position of each of these vertices and normals must be stored in memory, and be transferred from the CPU, where they are generated, and passed through the AGP bus to the graphics card. Increasing the number of triangles subsequently increases the number of vertices that need to be dealt with, and the amount of memory used. And when you are dealing with high-resolution textures, at 32-bit colour, with other associated memory-intensive effects, like Volumetric Fog or Anisotropic Filtering, then even DDR memory starts to balk at the amount of data that needs to be thrown around. As such, reducing the number of triangles that need to be passed between the CPU and the graphics card is a good thing.

In steps Truform. Basically (if there is a 'basically' for this), Truform takes the three vertices for a triangle, along with the three normals for these vertices (a normal is a vector that extends perpendicular to a surface), and substitutes this whole flat triangle with a curved point-normal triangle (called a PN triangle) using a cubic Bézier patch. Whoa – show me to my slide rule, and I'll see if I can make some sense of this.

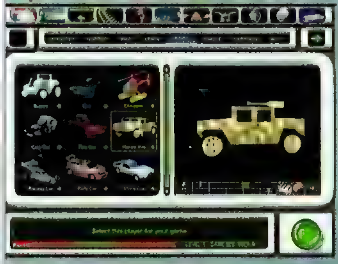
A Bézier patch is a mathematical function that works on a normal flat triangle, and generates a series of sub-triangles within it to give it a smooth curve over its surface, so what was one flat triangle might become nine smaller triangles fitted together to fit into the space of the original. The end result is a PN triangle, with a specific curviness to it that is defined by the properties of the normals from the original triangle. Another benefit of this procedure is that the PN triangle has more normals that are generated to fit the new vertices of the sub-triangles. Since most lighting and shading effects, like Gouraud shading, operate from normals, the more normals you have on a surface, the more detailed the effect.

Because the PN triangles are generated on the graphics chip, this means less data needs to be sent from the CPU, thus conserving bandwidth. Best of all, unlike new hardware features like Transform & Lighting, which need to be specifically coded for from the ground up, it is very easy to program to utilise PN triangles through Truform. A programmer just needs to make sure the flat triangles are specified in the proper way, with the three normals, and add a few instructions for the hardware, and the graphics chip will do the rest. WOOt.

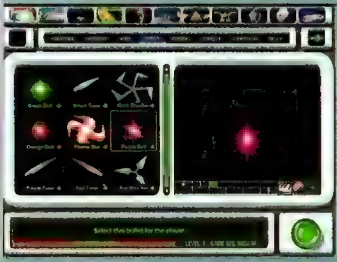
So, there you have it. It's Truform. It's maths. It's 3D. It's all good. And, hats off to Euclid, because after reading tech docs like these ones, you begin to realise how much geometry really rocks.



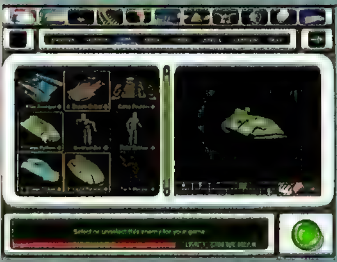
Step 1: Pick a scene.



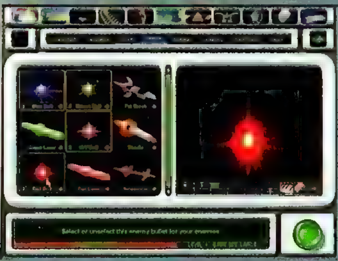
Step 2: Choose a player.



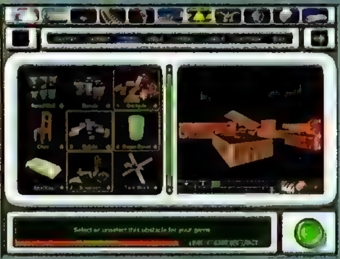
Step 3: Select your weapon.



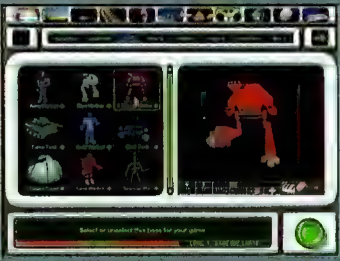
Step 4: Decide on your enemies....



Step 5: ...and give them weapons.



Step 6: Create obstacles.



Step 7: Add an end of level boss.

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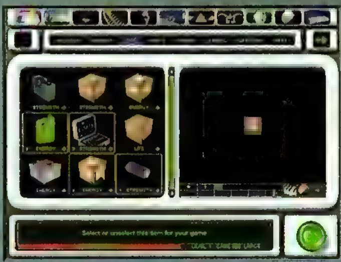
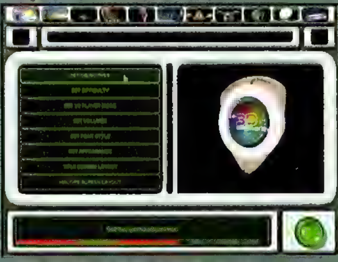
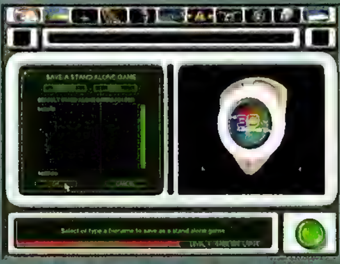


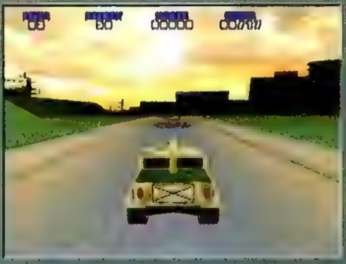
Step 8: Put in the bonuses etc.



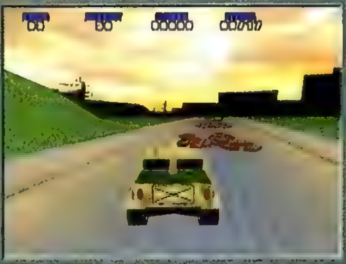
Step 9: Edit the game preferences.



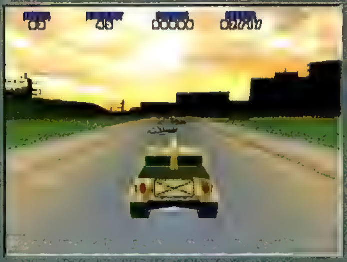
Step 10: Save it as an executable.



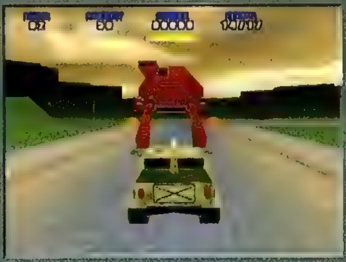
Step 11: Now PLAY the game!



Step 12: Avoid the obstacles!



Step 13: Destroy your enemies!



Step 14: Defeat the end of level boss!

Magnetic matters

Magnetic fields give joy. Or grief. Or pretty purple colours on your previously expensive monitor. Dan Rutter reports.

So I'm sitting here playing with astoundingly powerful magnets right next to my computer with four hard drives in it. And my nice 19in monitor that'll be permanently wrecked if the shadow mask gets magnetised. And I'm thinking about all the things that people know you're not meant to ever do, but which aren't really that bad if you know what you're doing.

You can wave hand-crushingly grunty neodymium-iron-boron magnets around quite close to magnet-sensitive devices in perfect safety because of two things.

One, magnetic field strength falls off roughly with the cube of the distance. That's an approximation, but it's a useful one, and it means that the one Tesla field from an NIB magnet the size of a marble isn't nearly that powerful 30cm away. Which is why my monitor is not permanently paisley.

By the way, I should mention that the management disclaims all responsibility if any readers decide to paint an impressionistic landscape on the monitor of a workmate with a magnet out of an old hard drive.

The other thing it helps to know is that magnetic fields and magnetic storage media do mix, as long as the field isn't really amazingly strong and/or doesn't oscillate.

If the field does oscillate – which it will if it's created by various kinds of electric motors, old electromechanical-ringer telephones, monitor degauss coils or a rare earth magnet stuck to a drill chuck – then it can scramble the contents of any magnetic media that are close enough. If it doesn't oscillate, then it can't.

So just fiddling with magnets as you read Slashdot will not wipe your hard drive.

(By the way, if you find yourself becoming aroused as I talk about magnets, check out www.dansdata.com/magnets.htm. But don't email me, you freak.)

Try explaining inverse cube laws and the difference between static and dynamic fields to the average Outlook user, though.

In order to avoid having to mop up drool from confused consumers, all of us Amazingly Knowledgeable, Windswept and Interesting Science and Technology Gods have fabricated a more easily explained conventional wisdom, which says: 'Don't put a magnet near your computer or, roughly speaking, your liver will catch fire.'

Computing is full of conventional wisdom like this.

Electrostatic discharge (ESD) precautions, for instance.

Some Computing For The Dumb books say that you should buy yourself an antistatic wrist strap and hook it up to something earthed while you work on your computer lest your house turn to liquid manure. Other books say to simply leave the computer plugged in and turned off, and touch the chassis metalwork periodically while you work.

And a lot of people fool with computer gear on top of an old newspaper on the dining room table, and don't notice anything getting fried. ESD effects can actually be quite subtle, as well as cumulative.

If you shuffle across a nylon carpet, jump in the air and strike a 6in spark onto your well-earthed GeForce3 Unobtanium card, then, yes, that trucker's probably toast.

And yes, it's possible to destroy hardware with static discharges smaller than a couple of hundred volts. You won't feel that, and you can build up that much of a charge on any fairly dry day while sitting in a perfectly ordinary chair – as opposed to those Van de Graaff Industries plastic school chairs.

So telling people that by just breathing they can become potential chip killers is not completely alarmist. Modern computers are riddled with highly static sensitive complementary metal-oxide semiconductor (CMOS) chips. It is perfectly possible to kill your CPU stone dead just by touching its pins.

But, demonstrably, lots of people assemble and upgrade computers without taking any particular ESD precautions, and the PCs proceed to work.

Some of these people have just managed to luck out and not measurably damage anything at all. But most of them, including me on occasion, haven't.

Static damage can be an all-or-nothing deal – take new gadget out of antistatic bag, instantly zorch it. But more commonly, the static damage is slight enough that the component in question is still well within what is tolerant, and works fine. Look at waveforms from said component on your oscilloscope and you'll see that what used to look like a Texas mesa in profile now looks like a really alarming ski slope instead. But it works.

(You do have an oscilloscope, don't you? No, I'm sure you've got one. Look behind your plethysmograph. No, that's your sphygmanometer, silly. Try again.)

Even if there's some static damage, the waveforms are still likely to be close enough for government work. The damage probably won't cause your computer to develop horrible stomach-turning instability problems. Probably.

In this case, the unconventional wisdom is 'Take reasonable ESD precautions, unless you can't, and if you can't, don't get too bothered about it.'

That'd look as lousy on a T-shirt as the truth about magnets, though.

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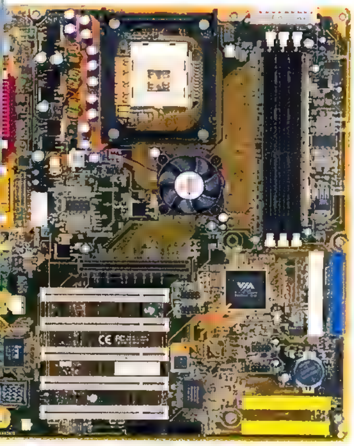

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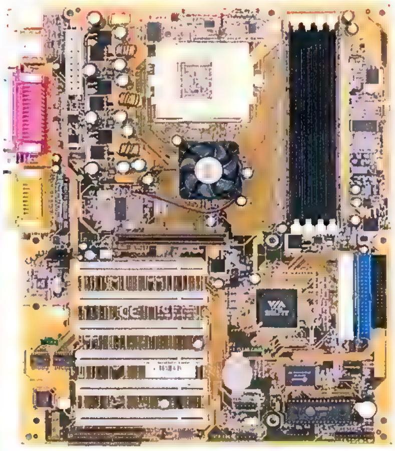

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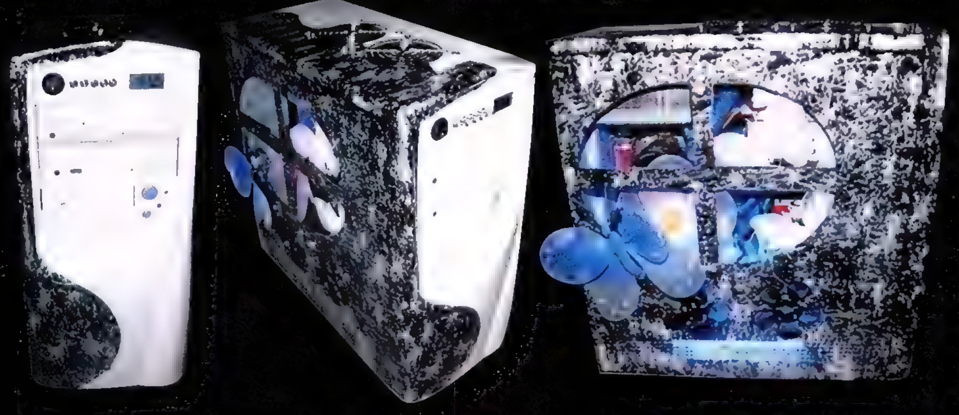
Ee Leng's flower box



Technical details

- Athlon 1.1GHz @ 1.33GHz
- MSI K7T Pro2-A motherboard
- 512MB SDRAM
- MSI GeForce2 MX
- Creative SB Live!
- Two 40GB hard drives
- Blue, rounded IDE cables
- Pioneer DVD-ROM drive
- Acer 8x/4x/32x CD-R/RW drive
- Five case fans
- Thermaltake Super Orb
- LCD CPU temperature probe
- Blue neon light
- Butterflies and flower

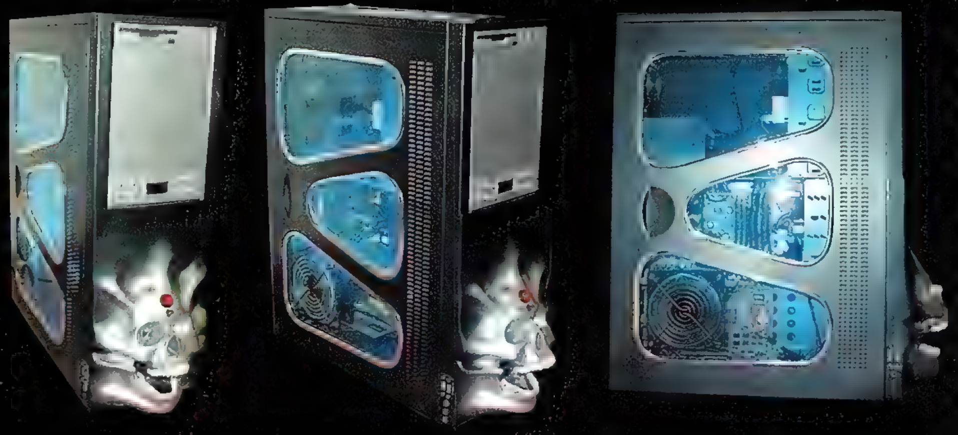
The story

This case was modded by me, my boyfriend Chen-po and my friend Matthew. After seeing all these masculine-like case mods, I decided it was time for a case mod with a feminine touch. Though Chen-po and Matthew wanted skulls and blood, I said, 'This is my freakin' computer and I will have FLOWERS!'

It is an AOpen case that only had a paint job when I first built it. The case was painted before we started cutting holes in it, which was annoying because we didn't want to repaint the thing again, so we cut carefully. Finding a place to do the cutting was difficult because we live in a college. So we had to do it in an isolated courtyard in the outskirts of the college in the middle of the night with lots of extension cords and a small table lamp.

I dual-boot Windows 2000 and Red Hat Linux 7.1. I don't do much on my computer besides homework, share movies and MP3s on my college network, and run SETI@home 24/7.

Salar's skull box



Technical details

- AMD Duron 700MHz @ 1GHz
- ABIT KT7A-RAID motherboard
- 512MB PC133 SDRAM
- 30GB IBM 7200rpm HDD
- 8x/4x/32x CD-RW drive
- Sound Blaster Live! Value
- 32MB Powercolor GF2MX
- Skull with moveable jaw
- CompuNurse temp probe
- Thermalright SK6 HSF
- PowerMan 300W PSU
- InWin Q-500 case
- Scratch-built baybus
- El cheapo no-name ISA NIC

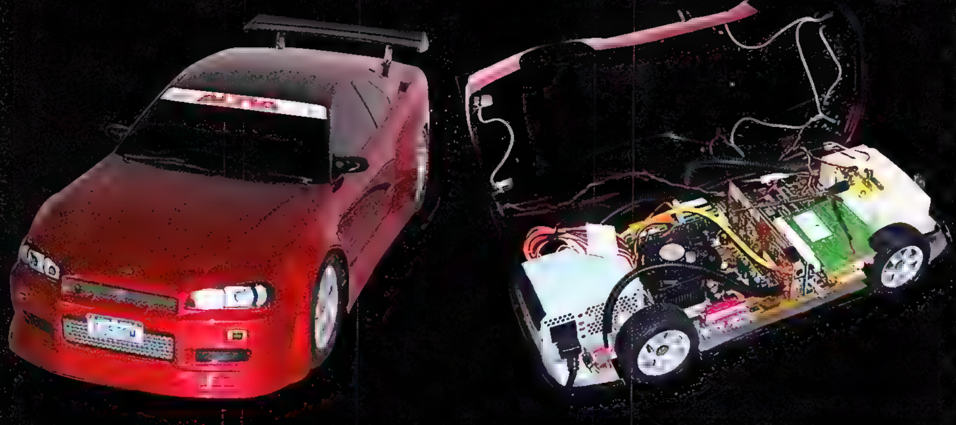
The story

When I first started planning a case mod, I knew that I wanted it to be something different and unique. My first few ideas were like all the other case mods, with plain old rectangular windows, blowholes, and so on. But then I came across something at a garage sale that gave me an idea. I found a plastic skull with a moveable jaw, and I knew right there that I had to put it on my case somehow. So I grabbed a tub of Bondo plastic filler (gluey stuff from Canada, where I live), and got to work. I had never used Bondo before, and quickly learned that it's messy, it stinks and it dries very fast. But I kept at it, adding layer over layer to the skull and case bezel. When that was done, I used a Dremel to carve out the grooves, and then sanded them down to a smooth finish.

The rest of the case mods involved cutting windows and blowholes, cleaning up all the wires, making a baybus, rewiring the power and reset switches, and painting.

Proud of your Hot Box? Send us a pic and you could win a free six-month subscription to Atomic! hotbox@atomicmpc.com.au

Ant's GT-R PC



Technical details

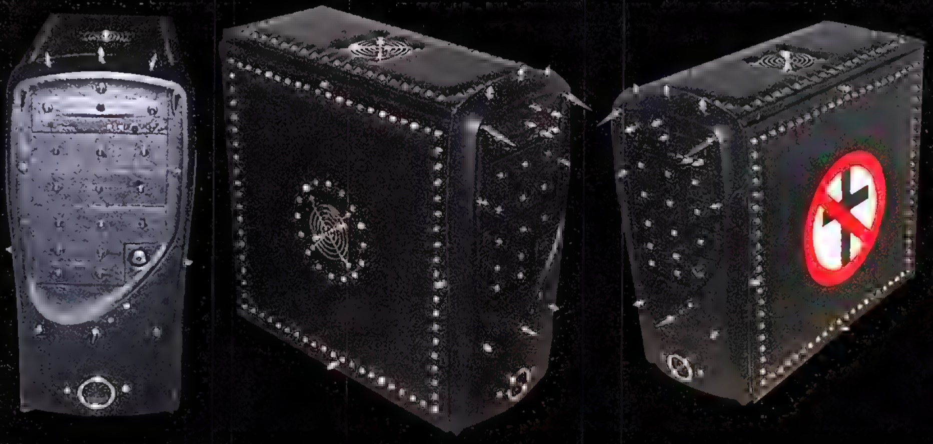
- AMD Duron 600MHz @ 910MHz
- ABIT KT7A-RAID motherboard
- 256MB Kingmax PC150 SDRAM
- ASUS V7100 AGP GeForce2 MX
- Sound Blaster PCI 128
- 15W internal speakers
- 20GB Seagate Barracuda II HDD
- 145W Micro-ATX power supply
- ThermoEngine
- Just Cooler Remote power
- Microsoft Natural Keyboard Pro
- Microsoft WheelMouse Optical
- NetComm Roadster 56K modem
- Windows 2000 Advanced Server

The story

I could only find one shell that would house a full-size ATX motherboard: the Kyosho GT-R Skyline.

A custom chassis was built using 2mm-thick aluminium. It provided the mounting points for the wheels, PSU and PC parts. But space was still at a premium inside the shell, so a number of mods had to be made to get everything to fit. The video card had to be cut away, with connections to the external ports soldered directly onto the circuit board. The LAN card was the only thing that fitted without modification. After the PC components were installed, it was time to add some cool details. Remote keychain power/reset. A working lighting system: park lights on standby, headlights on power-up and brake lights connected to the hard drive activity. When all the wiring was complete, the shell of the body was painted and the number plates fitted. Four months of planning and construction came to an end, and I think the results were worth the effort.

Panties' bondage box



Technical details

- Duron 800MHz
- FIC KT133 motherboard
- 256MB RAM
- 30GB Seagate HDD
- GeForce2 MX400
- LG 8x/4x/32x CD-RW drive
- Guillemot mouse
- All-natural vinyl skin
- Studz'r'us
- Devil inside
- Pagan hate symbol
- Brass nipple ring
- Small intake hole
- Large exhaust vent

The story

My bitchin' box took me the best part of a month to complete. I wanted a case mod, but neon, perspex and fluffy material has all been done to death. Boring! But no-one has done what I've done – leather and studs. Well, vinyl and studs, as leather is too pricey. Vinyl still did the job, and at $18 per metre it is better value and far more attractive in a slippery, tactile kinda way.

I used around 300 studs for the whole case. Most of them were little pyramid studs with the split-pin style grip, but a lot tougher than a split pin. Each one has its own little hole, and has been hammered on with great difficulty. Still, what box isn't difficult to make in the first place?

Drilling lots and lots and lots of 4mm holes is annoying, especially when you find that the stud shaft is actually 4.5mm – subsequently, every hole had to be re-drilled. It was well worth the effort, though. No-one can come close to my box now. It is truly hot.

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Hard drives

Simon Peppercorn finds out where all the bits go.

If you dismantle a hard drive, the mechanics appear deceptively simple. It is hard to believe that something so seemingly basic can perform with such speed and precision for many years.

Data is stored on hard disks on platters. Hard drives contain several of these, with each one capable of storing tens of billions of individual bits. Platters are generally made from aluminium, which makes them rigid. This is why they are called a hard disk as opposed to a floppy disk. The platters are coated with a magnetic medium consisting primarily of iron-oxide. It is this which allows data to be stored electromagnetically.

The integrity of these platters is critical for their ability to hold data, so they are precision machined to an almost perfectly smooth mirror surface. Some newer hard drives are made with glass-ceramic composite as this allows for enhanced rigidity and an even cleaner finish. This also has better heat resistance, and can be thinner than aluminium platters.

The rigidity is important as the stiffer they are (no jokes please), the faster they can operate. And the harder the better, as it allows for greater resistance to vibration and shock. Glass platters will soon replace the aluminium-alloy versions altogether.

Does size matter?

Contrary to popular belief, bigger is not always better these days. The amount of data that can fit onto a platter is defined by both its size and its areal density (also known as bit density), which is measured in terms of gigabytes per square inch. This is calculated using two known measurements. One is the track density, which refers to how many tracks are packed within a 1in radius. The other measurement is the recording or linear density, which is how many bits of data can be squeezed in to a single track. By multiplying these two measurements, you get the areal density. Seagate has recently released a hard drive that claims an areal density of 32.6Gb per square inch, with the drive itself storing a total of 80GB on just two platters.

While it is true that a larger platter can store more data, improvements in technology have allowed for greater areal densities. This means that more data can be stored on smaller platters than ever before. The desire for smaller platters is driven not just by convenience in size, but also by the knowledge that reducing the diameter of a platter by a factor of two, you are effectively quadrupling its rigidity. The other important benefit of smaller platters is the improvement in seek times, as the heads do not need to move as far to read or write data.

ⓘ The round bit isn't a frisbee; it's a platter.

With the development of smaller platters, spindle speeds have also increased, which also allows a drive to go from stop to full speed in a much shorter time. This translates directly to improved performance. Some of the newest 15,000rpm drives have a platter size of just 2.5in inside a standard hard drive external casing. Another major advantage of smaller platters is that there is less air friction when spinning at high speeds, which results in less heat being generated.

The form factor for a hard drive is based on the size of the platter, not the entire drive. The casing for a 3.5in drive is actually just less than 4in wide. The platters themselves are 3.74in. The 3.5in naming convention comes from the size of the 3.5in floppy disk, and because today's hard drives are designed to sit in a 3.5in bay, the term stuck. Most laptop drives use a 2.5in standard sizing. Original hard disk platters had a diameter of 24in! As late as 1999, some manufacturers were still producing 5.25in units such as the Quantum 'Bigfoot' model.

Although the logic board may be exposed, a hard disk is a sealed unit. This ensures that the platters remain free of dust or other loose particles, and prevent damage to the heads or other components. To aid prevention of contamination, the insides are maintained in a partial vacuum. The use of special filters allows air pressure to be equalised.

The platters are double-sided with a read/write head on each side. The heads are attached to spring-loaded actuator arms. When the platter isn't spinning, the head is in direct contact with its surface. When the spindle holding the platters gets up to speed, air pressure forces the heads away from the platter by barely a millionth of an inch.

The actuator moves the heads around the spinning platters, and is controlled by a servo motor. The servo acts as a guidance system for the actuator arm, allowing the head to be placed over the correct position on the platter. The servo is clever enough to know the exact location of the heads on the surface of the disk, and can communicate that information so the heads know when to start or stop the read/write process. This is achieved using a binary numbering system, which provides the servo with a cross reference, defining the position of the head and where it needs to be to access the next bit of data.

The other major component of a drive is the logic board. This is the circuitry on the outside of the drive. It controls the mechanisms inside the unit such as the spindle, the servo motor and so on. It's ▷

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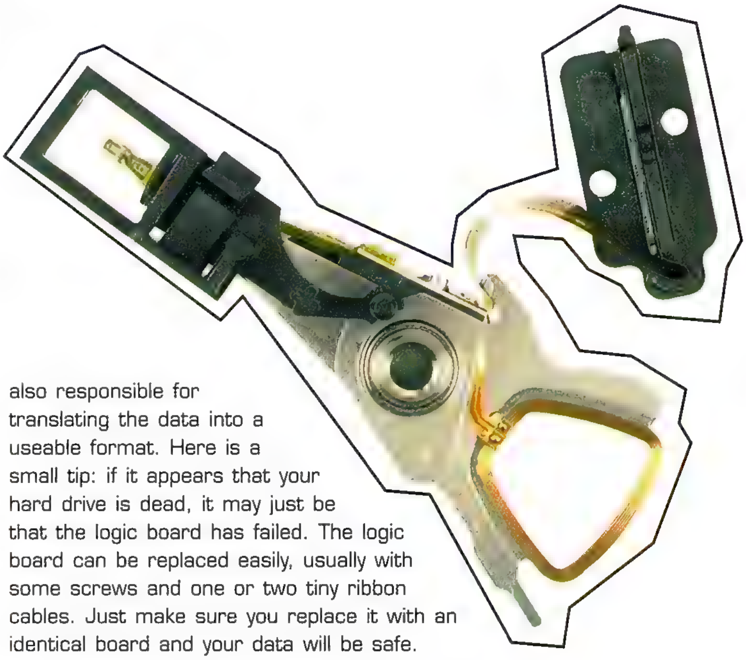

The hard drive's head and actuator.

also responsible for translating the data into a useable format. Here is a small tip: if it appears that your hard drive is dead, it may just be that the logic board has failed. The logic board can be replaced easily, usually with some screws and one or two tiny ribbon cables. Just make sure you replace it with an identical board and your data will be safe.

Speccy

The hard drives used in the majority of today's systems conform to the ATA specification, which is the communication standard between the hard drive and system. Originally implemented in the late 1980s, it saw the disk controller functions built into the hard drive itself. By making the controller an integral part of the drive and removing it from the PC bus, manufacturers could develop performance enhancements without being restricted by issues surrounding I/O standards of the day and by the uncontrollable influence of third-party manufacturers.

The most common interface seen in today's computer systems is IDE. ATA, Ultra DMA, Ultra ATA and many others are all IDE drives. Ultimately, ATA is the same as IDE.

The original ATA standard provided for two hard disks on a single channel in a master/slave arrangement. It also included support for both single- and multiple-word DMA modes and PIO modes 0, 1 and 2. Without launching into a history lesson on ATA interface developments, more recent years have seen the introduction of Ultra ATA and ATA/100. Ultra ATA is not a real standard; it's actually a Fast ATA with a cool sounding name, which included PIO mode 3 and multiword DMA mode 1. Just to confuse and confound everyone, there was also Fast ATA-2, a souped-up Fast ATA, which had PIO modes 3 and 4 and multiword DMA modes 1 and 2.

Originally, Ultra ATA ran at 33Mb/s, but there are now much faster Ultra DMA drives. The name doesn't necessarily reflect the standard being used or even the transfer rate of the drive. There is an Ultra ATA/66, which is DMA mode 4 running at 66Mb/s, and Ultra ATA/100, which uses DMA mode 5 and runs at 100Mb/s. Confused?

Fortunately, the drives are backward compatible. This means that you could use an Ultra ATA/100 drive with a 33Mb/s controller, but you wouldn't get the performance benefits of a faster controller. None of these rates are a reflection of the sustained transfer rate capabilities. An ATA/100 drive is more likely to perform sustained transfer rates of less than 40Mb/s.

What rate is that?

When referring to transfer rate, we need to consider both the external and the internal transfer rates. The external rate is affected by the type of interface and the mode it is operating in, but is also affected by factors external to the drive, such as the system's bus speed. The most limiting factor in terms of the external rate is the internal sustained transfer rate. The hard drive cannot send or receive data any faster than it has access to.

The external transfer rate, also known as the data rate, is quite simply the speed in which data is transferred from the disk to your system. It is defined in bytes or megabytes per second. Be careful here; some vendors, in their desire to sell you a 'faster' drive, will quote the internal transfer rate from the disk surface to the internal buffer of the drive. Others get equally clever and tell you the burst rate, which is the fastest the drive could ever transfer a tiny amount of data in the most optimal conditions in the shortest duration. While both these rates may be technically accurate, they don't necessarily provide a true reflection of the overall performance of the drive when transferring data to and from your system.

An equally important factor is the seek time. Because the head actuator operates as a mechanical process, it takes time to access various parts of the disk. The time it takes for the CPU to request data and for the heads to actually find and start reading is only a number of milliseconds. An average of 8ms to 10ms doesn't sound like much, but when you compare that with other critical parts of your system, which are measured in nanoseconds, you realise that a hard drive can be literally millions of times slower. Poor seek times can have a great impact on overall performance, with the rest of your system sitting idle while your hard drive plays catch-up.

You may hear the term 'latency' referred to in terms of hard drive performance. This is similar to the seek time. This is the amount of time it takes for the platter to spin to the correct location in order for the heads to perform the read/write function.

Both the seek times and the data rates are affected by, but not dependant on, the speed at which the motor rotates the platters. Generally, this is 5400rpm, 7200rpm or 10,000rpm. If you're loaded, 12,000 or 15,000rpm drives are available.

Storage capabilities are improving thanks to much development in the area, with capacity reaching levels that were inconceivable 10 years ago. Performance and reliability is also steadily improving. But the most important thing is, the prices of hard drives are become cheaper, making grotesquely large and fast drives available to the masses. And it's all good.

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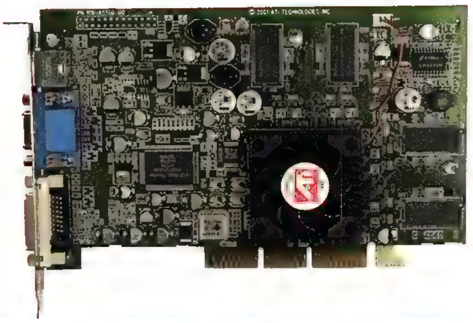

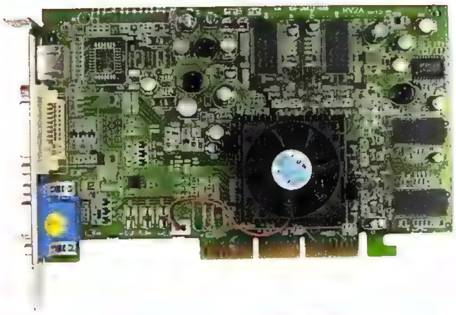

It had to happen. NVIDIA's reign over the bits that make the pretty pictures on your PC has at last been severely threatened by a product from the silicon surgeons at ATI. The all-singing, all-dancing Radeon 8500 showed that it has what it takes to bring the GeForce3 down in last month's Atomic, and its smaller sibling, the 7500, did darn well in this month's round-up (see page 57). So it is with great pleasure, and more than a little envy, that we are giving them away to a couple of lucky subscribers.

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Atomic12

CRT vs. LCD monitors

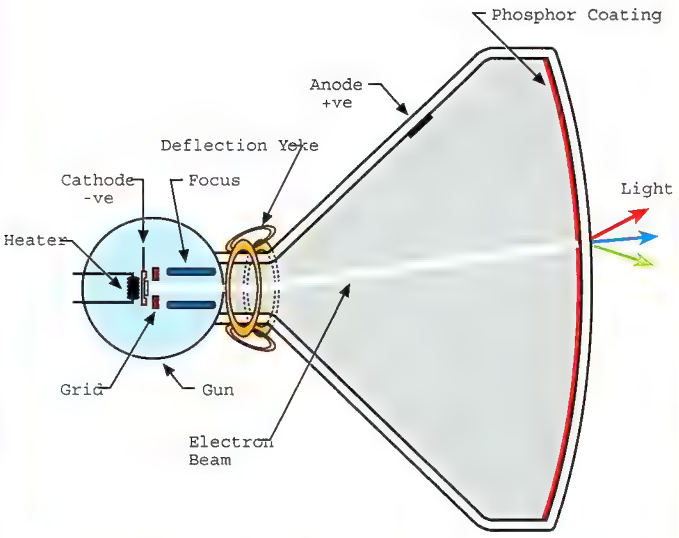
How you choose to see the world is a critical decision. Asher Moses clarifies the important details.

The two main types of monitor are CRT (cathode ray tube) and LCD (liquid crystal display). Also found on laptop computers, LCD monitors have entered the desktop market strongly and are becoming a viable alternative to the conventional CRT. Although liquid crystals were discovered over 100 years ago, the first LCD display was invented in 1971 by Swiss scientists Martin Schadt and Wolfgang Helfrich of Rolic Technologies.

When desktop LCD monitors were first introduced they were around seven times the price of a CRT monitor, which kept them well out of reach for many users. Now that we are seeing significant price cuts, LCD monitors are finally becoming a realistic alternative to CRT monitors. They still aren't quite as value packed as CRT monitors, but the price difference between the two is rapidly closing. CRT technology has been around for over 100 years and is still by far the most popular solution for PC monitors.

CRT

The electron beam gun, the deflection yoke and the cathode ray tube are the three major components in a CRT monitor. The quality of these three components will determine the quality of the monitor itself. Electron beams are shot from an electron gun in the neck of the cathode ray tube, which then strike and illuminate phosphors on the front inside surface of the CRT. The deflection yoke around the neck of the CRT creates a magnetic field, which controls the direction of the electron beams, guiding them to strike the proper position on the screen. Distortion appears at the edges of the screen because the longer beams that must strike the corners of the CRT are subjected to magnetic deflection for a longer period of time. If the same deflection current is applied to those beams, which are directed to the centre areas of the screen, their travel distance being shorter, they will not be deflected to such a degree. Thus, they will strike the screen sooner. To compensate, displays have a deflection circuit that varies the deflection current depending on the position that the electron beam should strike the CRT surface.



How they work

Size

The main advantage an LCD monitor has over an equivalent CRT is its smaller size. The lack of a cathode ray tube makes an LCD monitor very thin and compact, with an average depth of about two inches. LCD monitors are also very light, with a 19in weighing in at around 10kg, compared to an equivalent CRT monitor that weighs about 22kg. An LCD monitor is ideal if you have limited desk space and/or frequently transport your PC.

People often get confused when looking at the sizes of different monitors. A CRT monitor is measured with the bezel and viewable screen size included. This means that a 19in CRT monitor will have about an 18in viewable screen area. An LCD monitor, on the other hand, is measured by only its viewable screen size, so a 19in LCD monitor has a 19in viewable image area.

Viewing angle

An issue worth noting with LCD monitors is their viewing angle. An LCD monitor will need to be viewed from directly in front, whereas a CRT monitor can be viewed from a much wider angle. When looking at an LCD monitor from the side, the image can appear blurred or with inverted colours. While this problem is being worked on and should be fixed as LCD technology advances, for those looking to buy an LCD monitor in the near future, it is still worth taking into consideration.

Interestingly, this problem was initially touted as a privacy benefit by early TFT notebook vendors, as it's harder for other people in the same room as you to see what is on your screen.

Resolution

Another issue with LCD monitors is that they are fixed at a certain resolution. This is because, unlike CRT monitors, an LCD monitor that is, say, 1,024 x 768, has 1,024 horizontal and 768 vertical pixels in a grid array. This means that if you use any other resolution, the image will either not take up your whole display, or be stretched to fit. A CRT monitor, on the other hand, will work at any resolution. If you decide to purchase an LCD monitor, look for one that matches your preferred resolution.

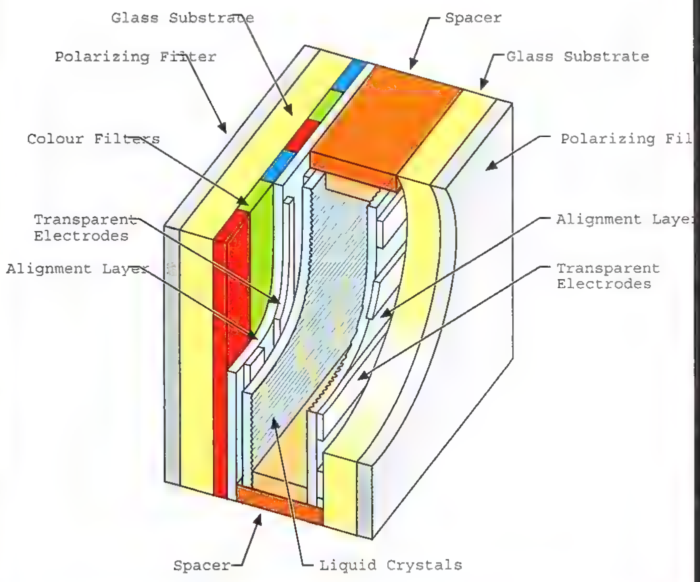
Performance and image quality

When it comes to image quality, a CRT monitor cannot even compete with an LCD monitor. This is because each pixel on an LCD is exactly the same and is arranged in a perfect grid. This results in perfect geometry and consistent focus without convergence or colour purity problems.

A common issue with LCD monitors is that they may have a few 'dead' pixels. The LCD panel consists of numerous pixels. The larger the size of the panel, the more

LCD

Most modern LCDs use Active Matrix technology, rather than the old Passive Matrix technology used in laptop computers. Passive Matrix displays are inadequate for desktop use because, when you make fast movements across the screen, the image tends to get distorted and blurred. An LCD monitor produces images by shining light through coloured filters or liquid crystals. In a colour LCD panel, each pixel is made up of three liquid crystal cells. Each of these three cells is fronted by a red, green or blue filter. Light passing through the filtered cells creates the colours you see on the LCD. Unlike CRT display technology, where the speed the electron beam is swept from the top to the bottom of the screen determines flicker (refresh rate), an Active Matrix display uses an active element (TFT) to control each individual pixel. Thus, refresh rates are not really applicable to LCD technology. This allows for much sharper text and also reduces eye strain due to flicker-free operation. The difference is obvious if you've viewed both types.



pixels and the greater the chance that some will be defective and remain fully on/off in particular areas. It is difficult to manufacture a large panel with zero defects using current LCD manufacturing technology. These defective pixels can usually be recognised as constant white/dark/coloured areas on the screen. Make sure you see an LCD monitor in use before you purchase it to make sure there aren't too many dead pixels. Since pixels can also die spontaneously, you should make sure that you get a good warranty as well.

Another thing to note is that CRT monitors react faster and display moving images better. High-end gamers and imaging professionals may find that LCDs don't display enough detail.

Due to the fact that a CRT monitor has a refresh rate and therefore has to refresh as fast as possible to keep a solid image, when the fresh rate goes up, contrast will have to come down. As mentioned earlier, an LCD monitor does not use refresh rates so it doesn't have these problems. If you are looking to purchase an LCD monitor for gaming, make sure it is digital. This is because an analog LCD screen will need to convert the digital signal from your frame buffer into an analog signal where it is sent to your monitor, and then back to digital where it is displayed. This results in a greatly degraded image.

Note that in order to run a digital LCD you will require a DVI output on your video card. Also, because an LCD monitor is fixed at a certain resolution, if you decide to play a game at a non-standard resolution you will get a distorted/blocky image because your monitor will stretch the image to fit the monitor screen.

If you are a gamer, a CRT monitor is best because it can run at many resolutions and has a faster reaction time. An LCD is great for people who have little desk space or often transport their computer.

Seeing things differently

CRT

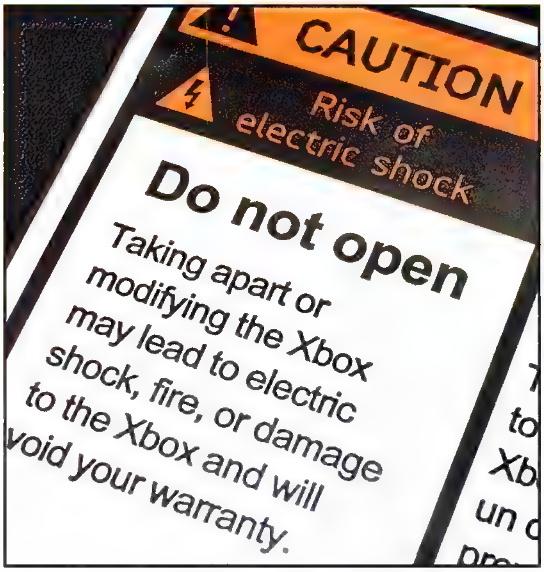
- Costs less, can be viewed from wide angles, particularly from the side
- Reacts faster and displays moving images better
- Can display a wider range of resolutions
- There are no 'dead pixels'
- Large and heavy

LCD

- Smaller and lighter
- Consumes less energy
- No flicker, which causes eye strain and fatigue
- They emit fewer low-frequency electromagnetic signals than CRTs
- They often pivot, allowing them to swivel to landscape (horizontal) or portrait (vertical) positions
- The flat face tends to reflect less glare

Inside the Xbox

We gave the Atomic Xbox to Daniel Rutter so he could have a tinker with it for this article. Tinker, apparently, can mean destroy. Go Dan! And in case you hadn't heard, this gaming beast is the closest a console can get to being a PC without actually being a PC.


CAUTION
Risk of electric shock
Do not open
Taking apart or modifying the Xbox may lead to electric shock, fire, or damage to the Xbox and will void your warranty.

As Microsoft's highly informative and not even slightly irritating advertisements keep telling us, Xbox is coming. Xbox is, of course, already here, if you live in the US. But lucky Europeans and Australians get to wait until March 2002.

We've got one, though.

And we've got a set of Torx drivers, too.

Let's play.

The $649 Xbox has often been described as 'a PC that looks like a console', but it's not, really. You can't run PC software on it; you can't upgrade the hard drive; you can't turn it into a little server on your network. Well, not yet, anyway.

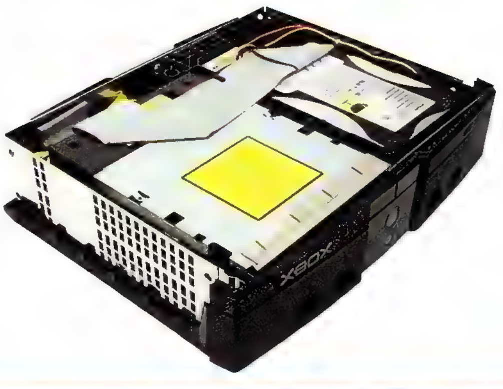
The reason why you can't do any of these things is that Microsoft really, really doesn't want you to. It, like every other console maker, is not making any money on the hardware. Actually, Microsoft alleges to be losing around $US100 per unit sold. It wants to sell you plenty of those $100 games to make up for that. If someone cracks the Xbox and makes it possible to use the things for something else – like Web servers, or game servers or for render-farm applications, for instance – then Microsoft will be very unhappy.

Accordingly, the Xbox has several security features that stop you from fooling with it. For a start, you can forget just sticking a bootable CD in the thing; in standard trim it'll only look at game DVDs with boot data on the second DVD layer. Everything on the hard drive, and everything on the game DVDs, is apparently encrypted, and the details of the scheme used remain secret.

So let's remove the Torx screws and see what's hiding on the inside.

Open the box

With the lid off, the Xbox looks very, well, computery. Not like a console. One 5.25in drive, one 3.5in one, one perfectly normal 40-way IDE lead. Delete the Microsoft branding and this could be some Taiwanese company's lounge-room baby PC. Except it isn't anywhere near as crapola as one of those toy PCs. Look a bit harder, though, and various non-standard elements rear their heads.



Hard drive and OS

The hard drive, for instance, is a normal 3.5in device, with a perfectly unremarkable 4-pin power connector, 40-pin IDE connector and block of jumpers. It's got a rubber shock protector wrapped around it, but apart from that there's nothing weird about it physically.

This drive is a 10GB Seagate ST310211A U Series 5 5400rpm. Some Xboxes come with a Western Digital Protege WD80EB, which is an 8GB unit, and it seems that both drives are partitioned to only 8GB.

The Xbox uses the hard drive for caching when you play games. As a result, you get relatively lengthy load times, but no DVD access pauses during actual play.

You can also, of course, store vast numbers of saved games on the drive, and when the 'Xbox Online' service is available, you'll be able to download game patches and extras.

You can also rip music CDs to the drive. The Xbox uses WMA audio compression to fit plenty of music on the drive (though you have to enter track names like high scores, using the controller), and you can then either use the console as a simple music jukebox, or play your ripped tracks as background music when you play games that support WMA background music.

So if you've always wanted to snowboard to Mantovani, now you can.

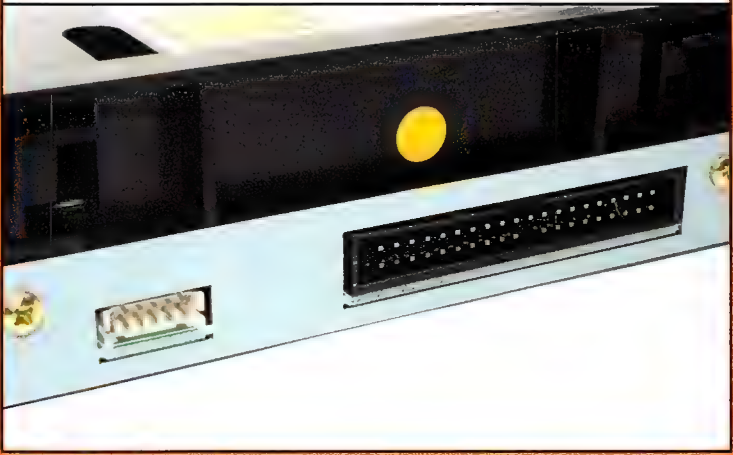
Plug this drive into a PC, though, and it won't be readable. Plug a PC drive into the Xbox and it'll just give you an error message. At the time of writing, no-one outside Microsoft seemed to know what file system the Xbox drive uses, or what other anti-hacking firmware features it might have.

When people figure out a way to read the Xbox drive, what they're going to find on it is going to be strongly related to the Xbox's chopped and lowered embedded-system version of Windows 2000. The Xbox operating system lacks practically all of the bells, whistles and gongs of desktop Windows 2000, and apparently has only a 500KB footprint.

DVD-ROM

The Xbox DVD-ROM drive is similarly unremarkable to look at from the front, even with its lid removed. But its rear panel is distinctly abnormal. As well as the standard IDE connector, it's got an odd 12-pin connector for power and specialised data, which connects to the Xbox mainboard via an anonymous collection of yellow wires. The DVD drive is manufactured by Thomson Multimedia, and apart from the specialised connections at the rear, is identical to a PC DVD-ROM.

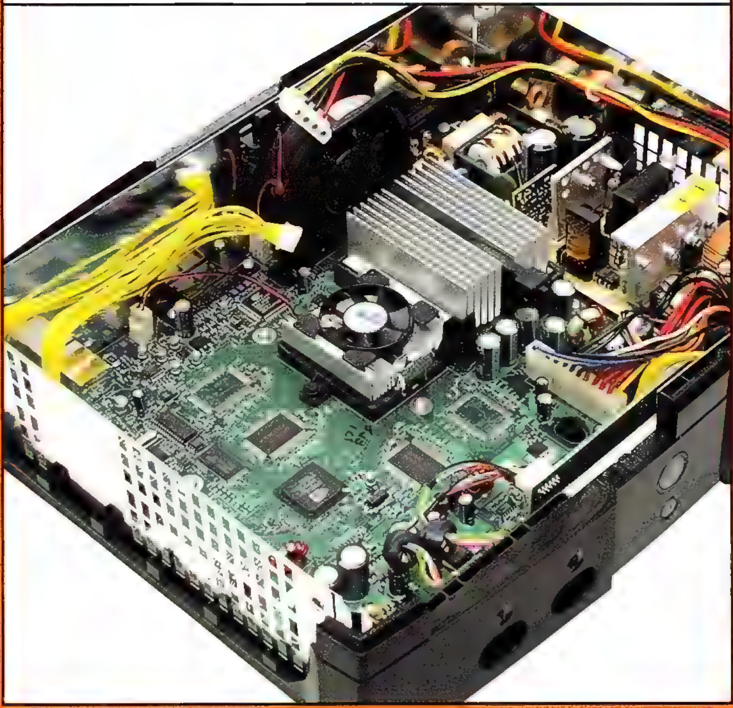
See? We told you it was like a PC.



Cooling

The Xbox mainboard is dominated by the fanless CPU heatsink. Well, it's technically fanless. Since it's right in front of the single rear exhaust fan, the CPU isn't likely to be under-cooled.

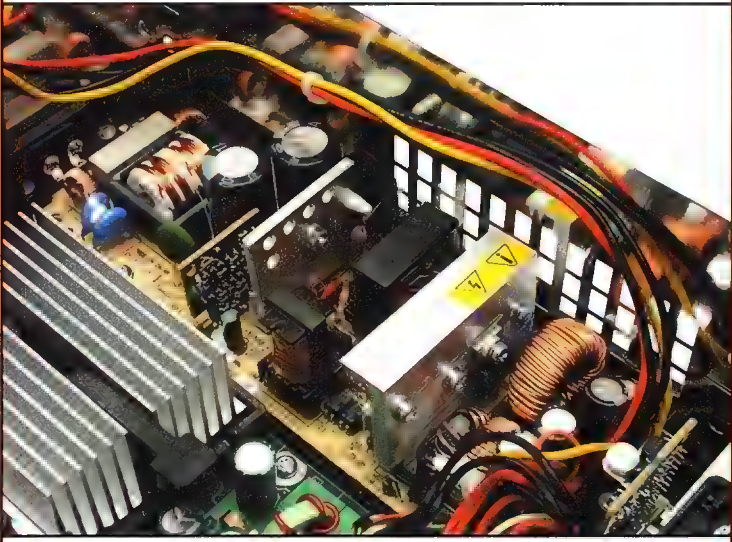
Next to the CPU is a little fan-equipped heatsink for the NVIDIA 'XGPU' chip – but more about this in a moment.



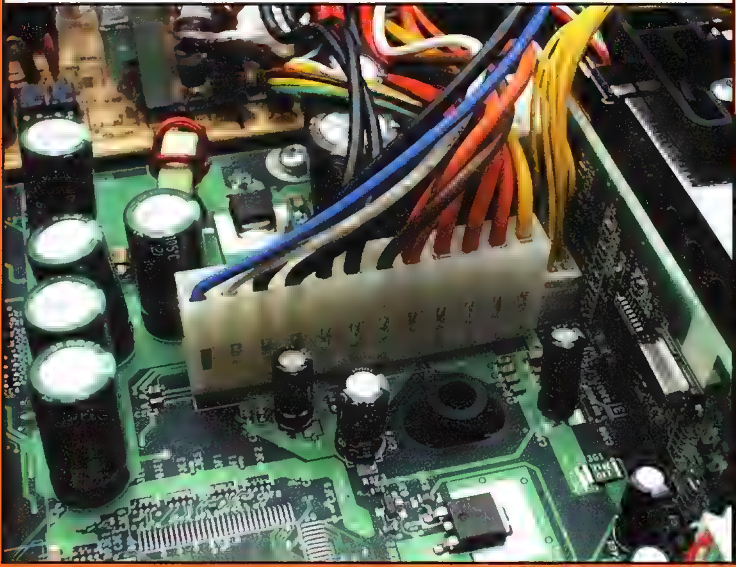
> 'On the far side of the CPU, there's the bare switchmode power supply, waiting to attack any Xbox hackers . . .'

Power

On the far side of the CPU, there's the bare switchmode power supply, waiting to attack any Xbox hackers who leave the thing plugged in when they fool with it. As you'll notice, the power supply components aren't hidden away inside a magical box of power-producing joy like on the PC.



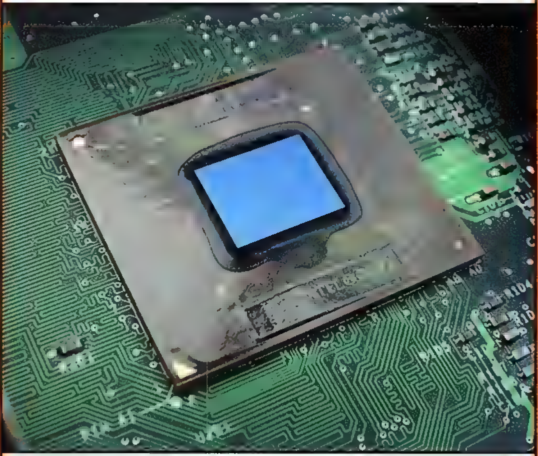
The power supply's main output cable terminates in this AT-style 12-pin in-line connector – old AT PSUs normally have two 6-pin plugs, but they plug into a connector not unlike this one. People who find this disturbing should note that the connector may be physically the same, but the pin-out is quite different. So you won't be using it in anything but an Xbox.



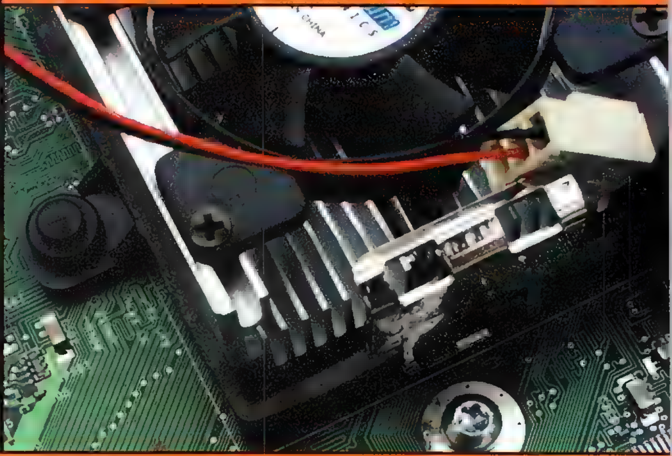
CPU

Remove the CPU heatsink and the Xbox's brain is revealed. It looks like, and more or less is, a 733MHz Ball Grid Array (BGA) Mobile Celeron. It counts as a Celeron, because it's only got 128KB of L2 cache.

But like every Celeron since the 533A, it's based on the Pentium III core, and it runs at 733MHz from a 133MHz frontside bus (versus 66 or 100MHz for 'true' Celerons), so it's no slouch. The difference between a PIII and a PIII-based Celeron at the same clock and FSB speed is trivial.



If you're harbouring thoughts of overclocking your Xbox, we hate to be the bearer of bad news, but you can't. Unless someone does some serious hacking, the only obvious way to change the console's speed is by replacing the clock crystal.



X-Chip

The big chip in the Xbox isn't the CPU, though. It's NVIDIA's 'X-Chip', known to people who've levered off its heatsink as the XGPU. The XGPU goes by the NVIDIA codename NV2A; the GeForce3 is the NV20. Yes, '2' does sound a lot lower than '20', but rest assured that this is one impressively powerful graphics processor.

The graphics side of this chip is not unlike the upcoming NV25. The major difference between the NV2A and the plain GeForce3, in its original or Titanium incarnations, is that the NV2A's got two Pixel/Vertex Shaders, as opposed to only one on the earlier chip. At a given clock speed, that gives the NV2A twice the theoretical maximum performance of a GeForce3. And the XGPU runs at 233MHz – only a hair slower than the 240MHz stock speed of the GeForce3 Titanium 500. While in theory this makes the Xbox a more capable device for churning out graphics than any current PC, this nightmarish scenario shouldn't last long; the upcoming NV25 should include these dual-Pixel/Vertex Shaders. However, it must be noted that there is a slight possibility NVIDIA could hold this off for a while to keep Microsoft nice and happy.

Microsoft quotes a 125 million polygon per second theoretical performance figure for the X-Chip. It won't manage that in the real world, but it should still be able to beat the PS2 by a factor of two or three.

In the real world, the Xbox would be likely to be able to get away with a plain GeForce3 and still produce more impressive 3D effects than you'll see in PC games, simply because every Xbox developer knows there's a GeForce3-level graphics adaptor to play with. So developers don't have to make games that can also work on other hardware.

The extra capabilities of the NV2A are just icing on the cake.

The XGPU's got a lot more than just a graphics adaptor in it. It's the heart of the whole console. It contains the processor-to-RAM-and-video interfaces, and it also apparently contains the console's encrypted BIOS data. So you can forget yanking out a simple BIOS chip and playing with it elsewhere.

Chipset

NVIDIA makes the Xbox's Southbridge chip, as well as the Northbridge buried inside the X-Chip. The two of them together are essentially a giant mutant variant of the nForce chipset.

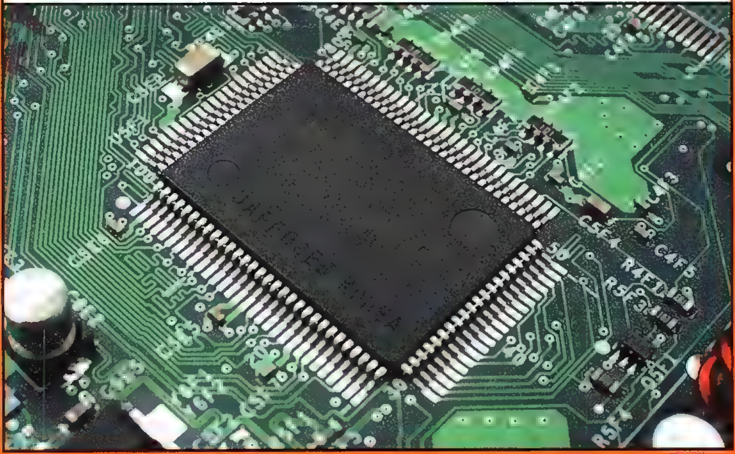
The Northbridge is the processor's interface to fast stuff like the graphics adaptor and the RAM; the Southbridge is the processor's interface to the slower stuff, such as the drives and input devices. The two of them are connected together using AMD's high-speed HyperTransport bus.

RAM

The Xbox uses four 16MB Samsung 5ns DDR SDRAM chips for its 64MB of RAM (two of them are on the underside of the mainboard). The RAM is freely divisible between main and video memory – the Xbox has a Unified Memory Architecture (UMA), which means there's no separate system and graphics RAM. And this isn't ordinary DDR; it's dual-channel TwinBank DDR, just like the nForce.

Along with the four RAM chips, there are also two empty chip locations on each side of the board. Xboxes (Xboxen?) with 128MB of RAM have been given to developers, but there have been no announcements about such gadgets hitting the retail channel.

Upgrading the memory yourself would be a non-trivial soldering job.



Pluggage

Apart from the power cord receptacle, there are only two sockets on the back of the Xbox, and one of them's where all of the video and sound get out. The larger connector is the Audio Video Input Output, into which you can plug different cables to give you different A/V connectors. The Xbox comes with the Standard A/V Pack. That's a grand name for a cable terminating in three RCA plugs: one for composite video, two for stereo audio. You can also buy an optional Advanced A/V Pack, which gives you a breakout box with a Y/C (S-Video) output for better image quality, and TOSlink digital S/PDIF optical audio output. You can plug that into current home theatre gear and anything else that accepts optical audio input.

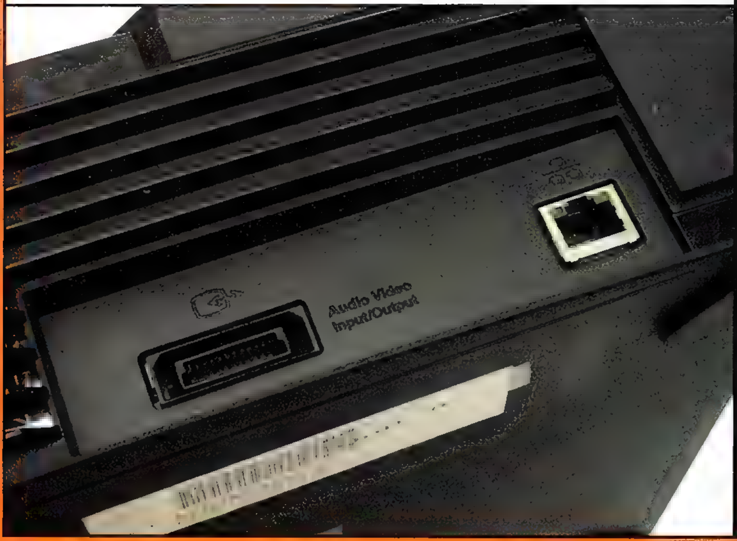
And there's a good reason to do so; the Xbox supports Dolby Digital (AC3) surround sound. Plus, of course, 3D positional audio for people who like to hear alien monsters on the ceiling behind them.

If you've dropped big dollars on a high-definition TV, you'll want the High Definition A/V Pack, which has true component output, and lets you play your games in 720p or 1080i. Back in the cheap seats, if you've got an elderly TV with no composite input, you'll need to pay extra for an RF Adaptor to let you plug the system into the antenna socket. The smaller connector on the back of the Xbox is a perfectly standard RJ-45 Ethernet jack, complete with the usual two LEDs. You can plug the Xbox into a 10BaseT or 100BaseT LAN on which there are other Xboxes, to play multiplayer games like Halo. There's an 'Xbox System Link Cable', which is just an expensive and funky looking 10/100BaseT crossover cable; to connect more than two Xboxes, you use a normal hub or switch.

That's all you can officially do with the RJ-45 connection so far.

Microsoft says that the Xbox Online service will be available in the first half of 2002. To use the service, players are going to need a normal broadband account from an ordinary ISP, and an account with Microsoft as well. There seems to be no reason why such a system couldn't work for broadband-equipped Australians without any special local Xbox Online presence, as long as Microsoft let Aussies sign up. But if there are going to be remote Xbox Online servers for action games, latency issues will be nasty for Australians if there's no local presence.

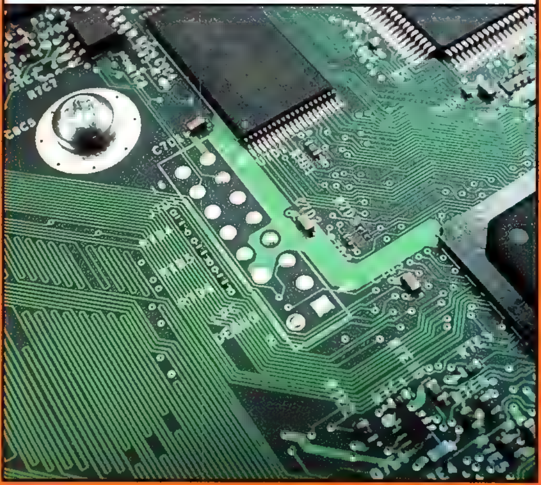
If all you want to do is make your distant friends' Xboxes believe they're plugged into yours, you can do it if you set up a Virtual Private Network (VPN) between your LANs over the Internet. That's a lot of effort to go to just for games, but, fortunately, there's a more elegant purpose-built Xbox Gateway package as well, available for the grand sum of zero from www.xboxgw.com.

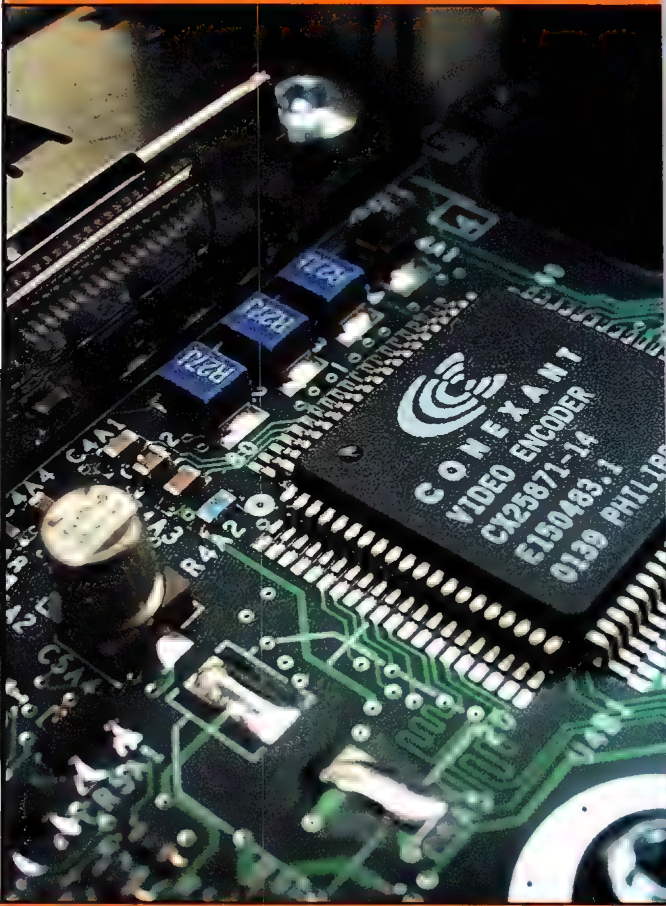


Debug

A mysterious block of 15 solder pads, the notation next to which includes the tantalising word 'DEBUG', has attracted considerable attention in the wannabe-Xbox-hacker community. What the heck this does isn't yet known, but some of the world's more devious minds are working on it.

Some of the world's most devious minds are, of course, probably just busy getting Microsoft engineers drunk.





TV/DVD

This Conexant CX25871 chip handles the Xbox's TV output. The same chip is used on various TV-output GeForce3 cards as well.

This chip isn't just your basic composite encoder. It's able to 'upconvert' various image formats to the 1080i (1080 lines, interlaced) and 720p (720 lines, progressive scan) formats beloved of owners of HDTV sets and projectors.

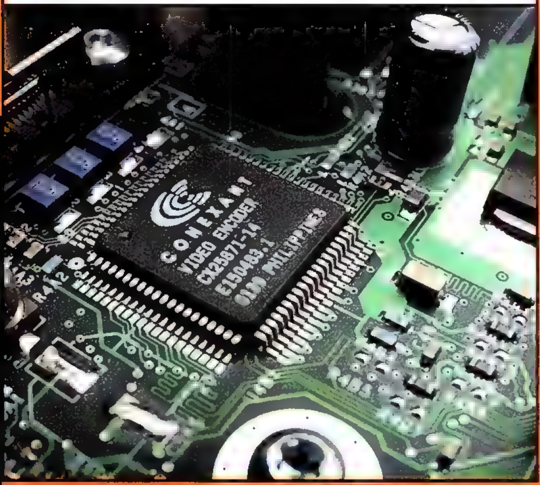
So you can use the Xbox as a fully HDTV-compatible DVD player, right?

Wrong.

First up, the Xbox may have a DVD-ROM drive, but it can't play a DVD at all unless you also buy the DVD Movie Playback Kit, which unlocks the DVD playing function. The Kit gives you a remote control and an infra-red receiver that plugs into a controller port as well, mind you, so you're not just paying for a 'registration key'. But the DVD playback you'll get from the Kit-equipped Xbox will be 576i only (for PAL Xboxes; the American NTSC one we played with manages 480i at best).

No higher resolutions.

You can play games in super-resolution, but you can't play DVDs that way.

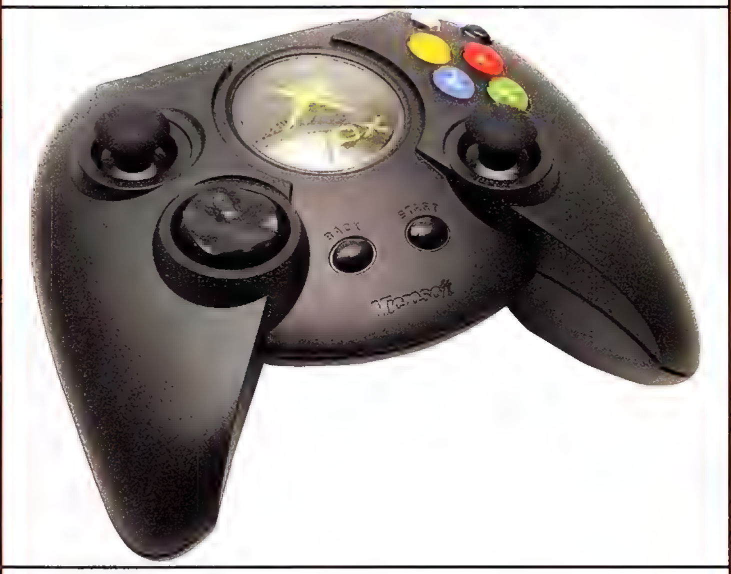


Control pad

The Xbox Controller is a chunky unit, with considerable central real estate taken up by the flashy reflective Xbox badge.

This is the 'gaijin' controller, sold everywhere but in Japan; Japan gets a somewhat smaller controller with the same buttons in a slightly different arrangement, and there are rumours about a similar slimline controller replacing this one.

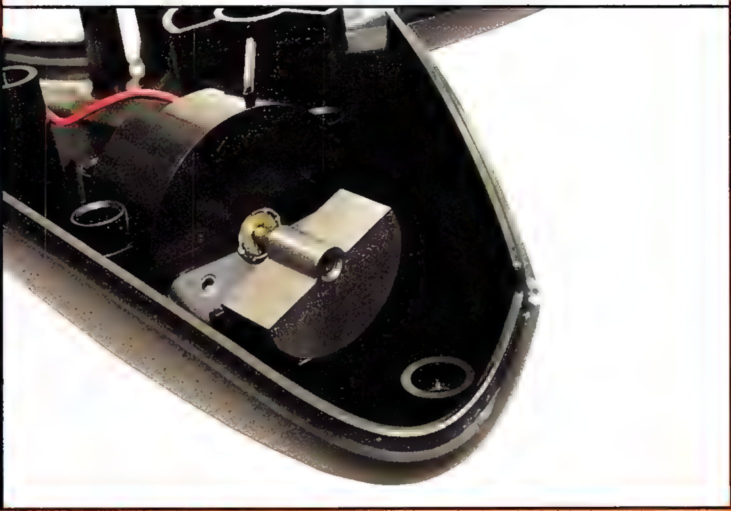
If you don't mind the size and shape, though, there's plenty of flexibility here. Judging by our play test with the Xbox, you will probably find the controller to be quite comfortable.



It's got the same shaker motor design as other controllers, too. Like Sony's vibrating PS2 controller, the Xbox Controller has one little electric motor connected to an off-centre weight in each of its 'arms'. The left arm motor has a big weight; the right arm motor has a little one.

By changing the combination of motors in use, the controller can simulate any number of sensations that aren't very much like being in a jet plane that's been hit by a missile, or in a racing car that's hit a wall.

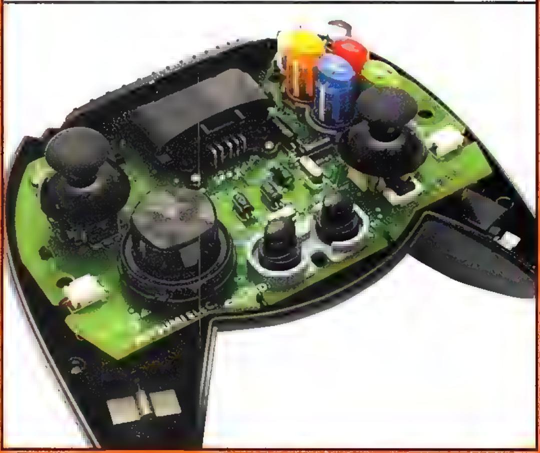
But if people who'd been through those experiences had the option of just having their hands buzzed a bit, they'd probably take it.

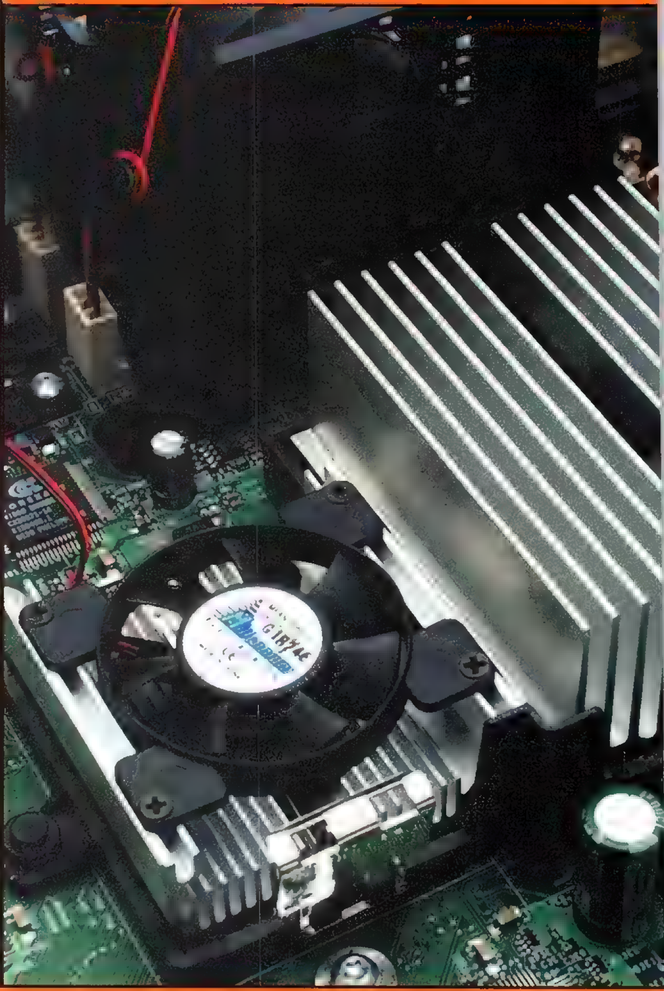


Inside, the controller's utilise exactly the same rubber-membrane switch design as other current console controllers, such as those on the PS2, and a relatively uncluttered circuit board, thanks to the thing's generous dimensions.

The controller has two analog joysticks, both of which can be clicked down for a button effect. There's also an eight-way pad, six pressure-sensitive right-thumb buttons, plus the Back and Start buttons in the middle.

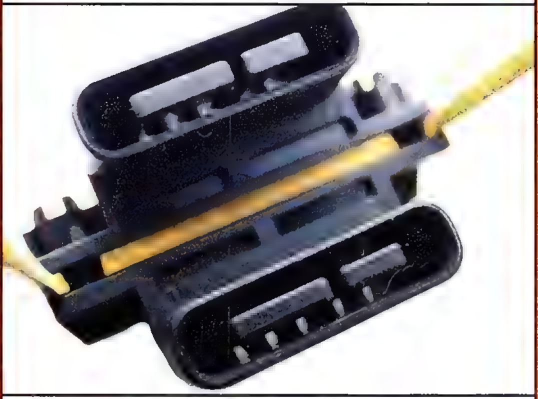
Two analog index-finger triggers lurk under the controller, but they're much better seen when you've got the lid off.



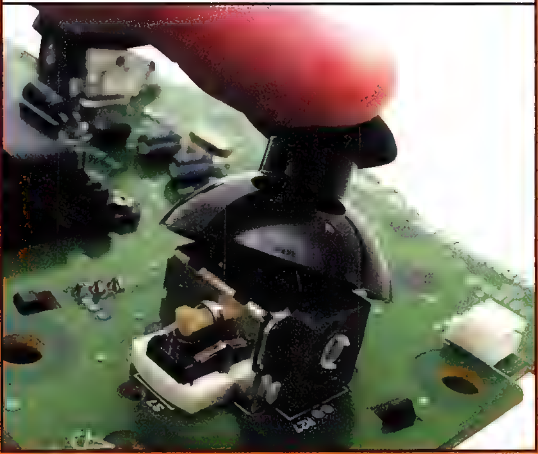


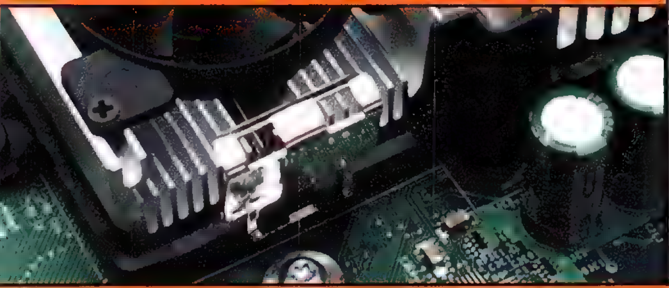
The two connectors in the nose of the Controller – which are rather easier to see when you take the controller's circuit board out of the case – are for memory cards and other accessories, like the upcoming Xbox Headset for voice communication. The Xbox's hard drive is used for local game saves, but memory cards make saves portable.

The upcoming Xbox Online service promises to make Internet save-game trading possible, too. Isn't that going to be fun? Woo, hoo!

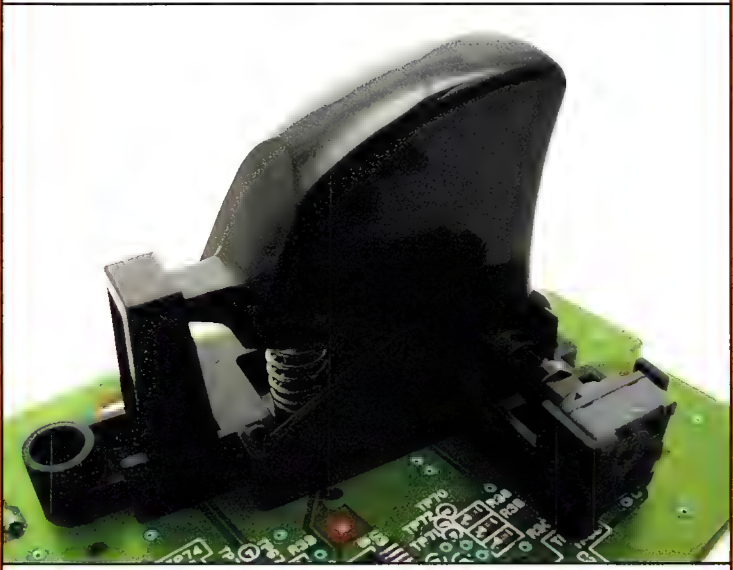


The controller's analog sticks use the same basic design as in previous stick-equipped game pads – little spring-loaded potentiometers. There's an extra microswitch on one side for the click-down action, though. This switch can only be pressed when the stick is close to vertical.

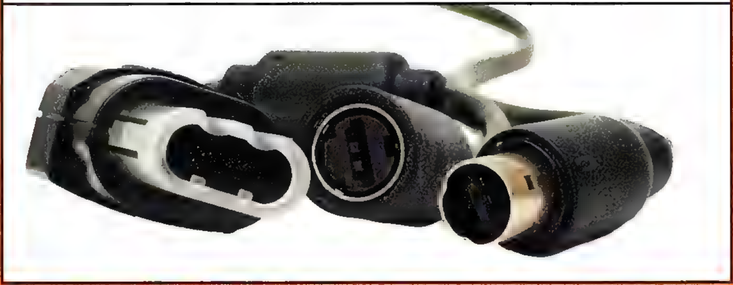




The trigger buttons are robustly made, with another little potentiometer to report their position.



The controller plugs are the only kind that you can plug into the front of an Xbox. There's no USB, or any other standard PC connectors. Microsoft has no plans for a keyboard or mouse controller; this is a game box with no computer-y pretensions.



Conclusion

In the console world, it's great if your hardware can do things that nobody else's can do, and the Xbox certainly wins in that department. The PS2 still doesn't quite have a hard drive as an option, much less standard equipment, and the Xbox's PC-derived processor and graphics hardware are outstanding.

But the Xbox's fancy features won't magically make games fun. For consoles, it's all about quality software, and lots of it. So it remains to be seen whether the Xbox will take the fight to Sony and Nintendo.

It also remains to be seen how readily the Xbox can be subverted into roles other than those Microsoft intended for it – if it can be at all. Microsoft hopes that Xbox hacking will be more trouble than it's worth, and it may be right.

But time will tell. There's one advantage to the late Australian Xbox release date. When 240V PAL Xboxes are finally available locally, we're likely to have at least a preliminary answer to both the 'quality of games' and 'hackability of hardware' questions.

R.I.P. DC.

Double vision

First he wanted to kill it, now he wants to kiss it. John Gillooly enjoys a renaissance in DDR motherboards.

'DDR may well be the way of the future, but for now, we in the Atomic Labs are more than happy with the pricing and performance levels of trusty old SDRAM.'

Way back in Atomic 3 we concluded our DDR vs. SDRAM Head to Head with those very words. The great news is that the future is finally here and DDR no longer sucks. While the RAM itself hasn't changed, chipset manufacturers seem to have finally gotten their collective heads around the technology, and are managing to deliver solutions that blow SDRAM out of the water.

VIA has been pimping DDR for a long time now, but suffered from lacklustre performance with its KT266 chipset. Thankfully, a new memory controller was developed for the Pentium 4 P4X266 chipset, which was bred with the KT266 to create the KT266A. Similarly, both ALI and SiS have new memory controllers for their chipsets (SiS-based boards should be on the market in a few months).

NVIDIA is also a potential threat with the nForce. Unfortunately, the chipset still isn't making much of an appearance as motherboard manufacturers continue to iron out bugs in their boards.

The one company that did have a semi-decent DDR chipset was AMD. Because AMD is not a chipset maker by trade, the plan was always for the 760 chipset to last long enough for third-party chipset manufacturers to get support out there. Now that this is finally happening, AMD is scaling down the production of the 760 and focusing on the multiprocessor version.

Board senseless

The downside of this burst in chipset development is that it has made the motherboard market that much more confusing. Most manufacturers already had a KT266 solution, and these are now being made using the KT266A. The noticeable exception was ABIT, which was just about to release its KT266-powered KR7-RAID board when the KT266A hit.

Other manufacturers have just tacked some sort of suffix onto the existing model name; unfortunately, these are often counter-intuitive and conSiSt of a mishmash of –E, A, +, or similar additions.

To sort out just what Athlon DDR board rocks our world, we have lined up an array of motherboards, most of which use the VIA KT266A chipset, but there are also appearances by the nForce, ALiMAGiK 1 and the venerable AMD 760. We also threw in our Athlon SDRAM reference board, the ASUS A7V133, which uses the VIA KT133A chipset.

The boards have all been tested using an Athlon XP 1800+ (1.53GHz), 256MB of CL2 DDR RAM and a Hercules Prophet III Ti 500 video card. These high-end components were used to minimise bottlenecking, as well as to free up the motherboard to go as fast as it damn well pleases.

Our benchmark suite for this round-up consists of Quake 3: Arena using CPU settings, SYSmark2001, SiSoft Sandra 2001 and SPECviewperf 6.1.2. We used Windows Me and all boards were tested using the latest available drivers. In order to avoid unrepresentative tweaking of the BIOS, we set the motherboards to their performance defaults (or failing that, the standard defaults). The one setting we did alter was the AGP aperture. There is a bug related to certain BIOS versions of VIA-based motherboards when used with GeForce3 cards and Windows Me. This is easily fixed by changing the AGP aperture to 128MB, so for consistency's sake all boards were tested with this setting at 128MB.

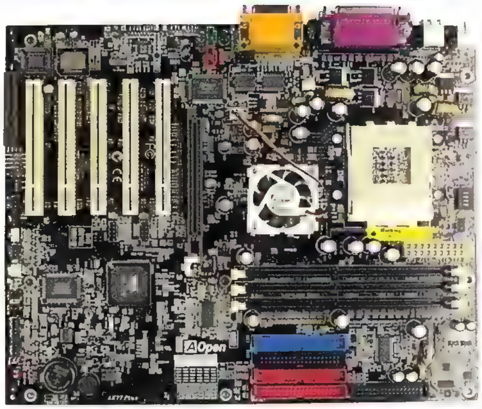
▷

AOpen AK77 Pro

Renowned for making good, stable motherboards, AOpen also has the honour of being one of the first companies to make a move away from boring PCBs to the now common coloured ones.

The AK77 Plus continues this legacy with a black PCB and metal HSF for Northbridge cooling alongside three DDR and five PCI slots. The board we tested was the AK77 Plus, which won't be sold here in Australia, but only differs from the AK77 Pro by adding IDE RAID support.

Price: $310 **Web site:** www.servex.com.au

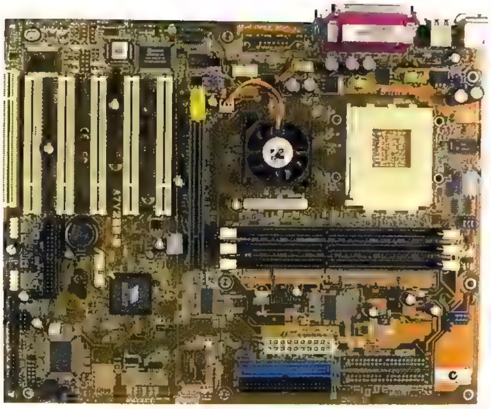


ASUS A7V266-E

One of the more successful series of Athlon motherboards over the past year has been the A7V range of boards from ASUS. The A7V266-E replaces the fairly recent A7V266, with the only major change being the update to the KT266A chipset. The board features three DDR, five PCI slots and the standard ASUS AGP Pro slot.

One disappointing thing about this board is the rather limited BIOS options, including the lack of optimised default settings.

Price: $345 **Web site:** www.achieva.com.au

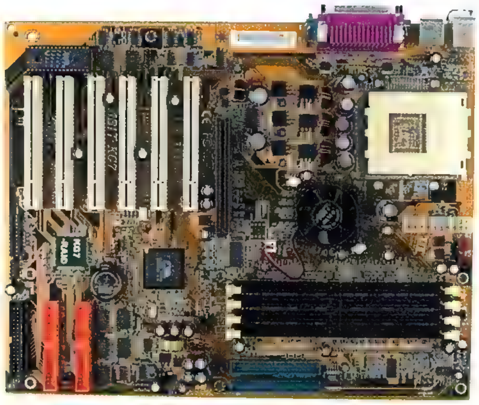


ABIT KG7-RAID

The combination of the AMD 760 Northbridge and the VIA Southbridge has been used extensively over the past year, but ABIT managed to squeeze something special out of it with the KG7-RAID.

The board has four DDR slots, which is unheard of on 760 boards, and is only seen on the Shuttle AK31V3.0. The BIOS is a tweaker's paradise, with enough options to intimidate even the most resilient overclocker. The board also has six PCI slots and a HighPoint ATA100 RAID controller.

Price: $369 **Web site**: www.synnex.com.au

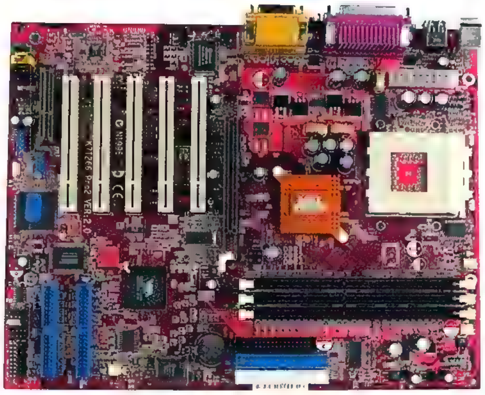


MSI K7T266 Pro2-RU

Take one red PCB and slap everything you can find onto it – this is the philosophy behind the K7T266 Pro2-RU. In terms of features it stands well ahead of the other boards. As well as three RAM slots, five PCI slots and Promise IDE RAID the board also supports a total of four USB 1.1 ports and four USB 2.0 ports as well as a D-LED diagnostic readout.

The board lacks a CMOS clear jumper; however, holding F10 when rebooting clears the CMOS.

Price: $350 **Web site**: www.msicomputer.com.au

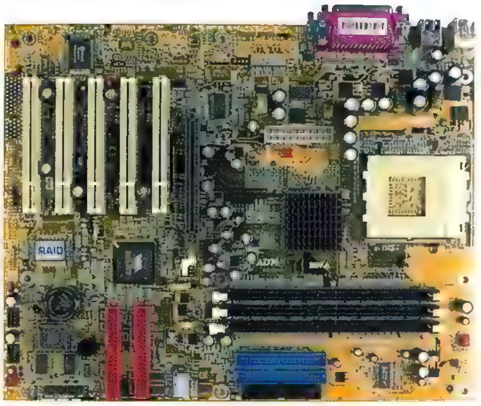


DFI AD70-SC Rev A

DFI is yet again one of the first on the scene with a KT266A board. The AD70-SC Rev A comes on a standard gold PCB, sports the standard three DDR slots, five PCI slots and IDE RAID via a Promise controller.

The set of options in the BIOS is standard, without the extra options seen on other boards. As we expect from DFI, this board may not have too much in the way of fancy functions, but it is a nice, stable and cheap motherboard.

Price: $252 **Web site**: www.bbf.com.au

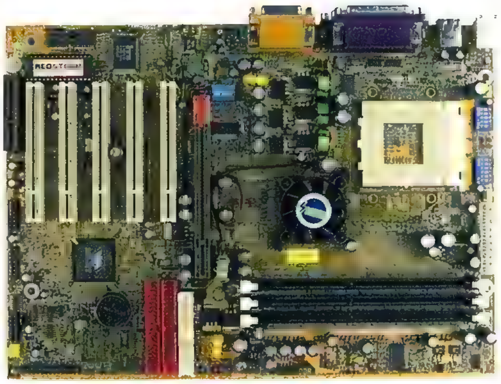


Soltek SL75DRV2

Soltek's focus on overclocking and tweaking has earned the company the honour of being the Hong Kong overclocker's board of choice. The SL75DRV2 continues this tradition, combining the KT266A chipset with Soltek's BIOS-based tool for overclockers, called Red Storm Overclocking.

The board also has a suite of other options and features. The rest of the BIOS is fairly standard, but the board comes with five PCI slots, three RAM slots and dipswitches for overclocking.

Price: $205 **Web site**: www.soltek.com.tw

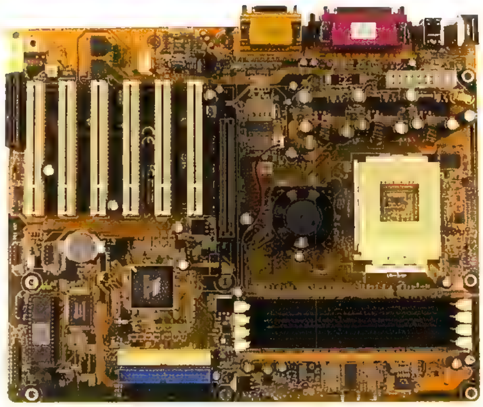


Shuttle AK31V3.0

Shuttle seems to be a company on the rise, and the AK31V3.0 is definitely an impressive board. The board itself is standard, apart from the addition of a fourth DDR RAM slot.

This fourth slot is quite a difficult thing to implement, so kudos to Shuttle for making the effort. The board features six PCI slots and is also the cheapest motherboard in the round-up.

Price: $184 **Web site:** www.satotech.com.au

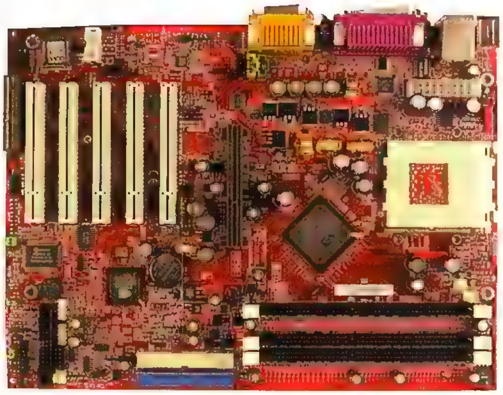


MSI K7N420

A month after our first look at the nForce, there is still only one board on the market. The MSI K7N420 uses the nForce 420 chipset and comes with three DDR slots, five PCI ones, integrated GeForce2 MX-level graphics, Dolby Digital sound, an AGP card for TV-out plus other nForce goodness.

The big disappointment with this board is the lack of overclocking options, which does not bode well for the board's success among the overclocking community.

Price: $445 **Web site:** www.msicomputer.com.au

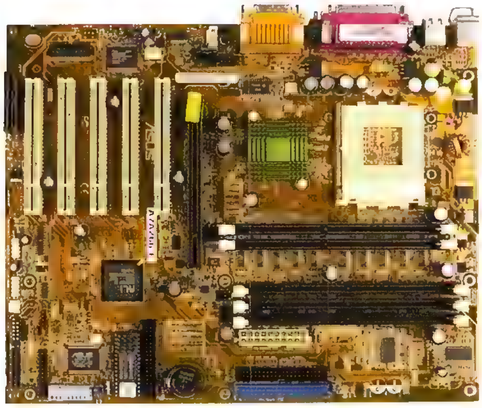


ASUS A7A266-E

It's amazing that all the chipset manufacturers have finally gotten their act together and delivered high-performance solutions. The A7A266-E uses ALi's ALiMAGiK 1 chipset and shows a significant boost over the previous iteration of the board. The A7A266-E is a dual DDR/SDRAM board with three SDRAM and two DDR slots.

There are five PCI slots, and this board is also one of the few that has no CMOS clear jumper, only contact points on the motherboard.

Price: $309 **Web site:** www.cassa.com.au

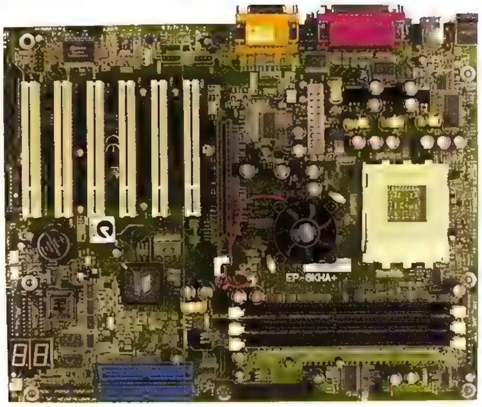


EPoX 8KHA+

EPoX is known for making highly tweakable motherboards, and continues this legacy with the 8KHA+. Rather than going down the road of funky PCB colours, this board is a stock green and sports a diagnostic LED readout for reporting errors during POST.

The board is overflowing with tweakability, which has driven EPoX 's reputation. It features three DDR and five PCI slots.

Price: $229 **Web site:** www.westan.com.au



COOLER MASTER®

ACTIVE THERMAL CONVECTIVE SYSTEM

www.coolermaster.com

PCPlus
EDITOR'S CHOICE

PCPlus Verdict.....9/10
Choosing which case deserves the Editor's Choice award wasn't a hard decision to make. For the ultimate in build quality, accessibility and good looks the Cooler Master has to take it. It's an absolute joy to work with and beautifully built. The only downside is that the price doesn't include a power supply.

MAXIMUM PC
EDITOR'S CHOICE

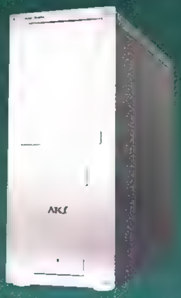
Verdict.....9/10
IF you want sexy, Cooler Master's Aluminum case has it in spades .
Cooler Master ATC-200 is simply the most beautiful case we've ever seen. Made entirely of aluminum, the cooler master is built with the fit and finish of an aircraft. The case is designed for ATX boards exclusively, with a mobo tray that slides out for easy maintenance.

ATC-210

ATC-201

ATC-500

ATC-100


ATC-101

ATC-200

ATC-110

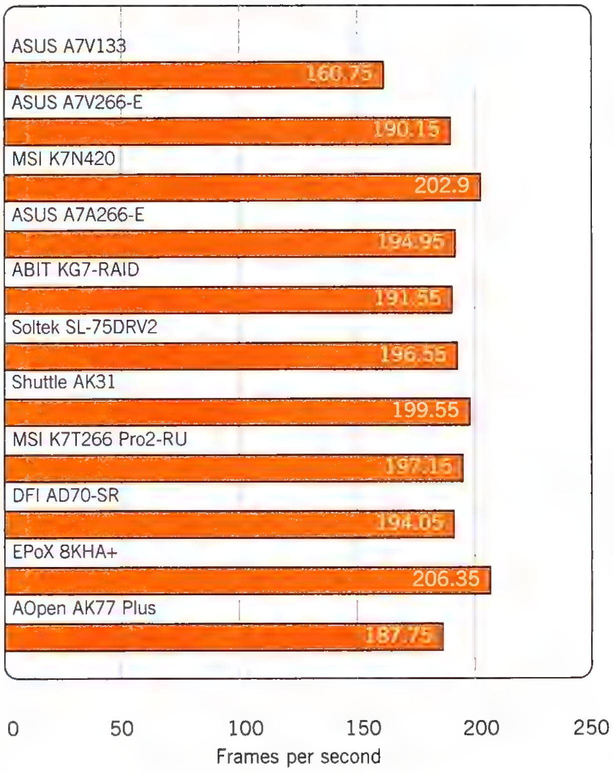
ATC-310

www.australiait.com.au

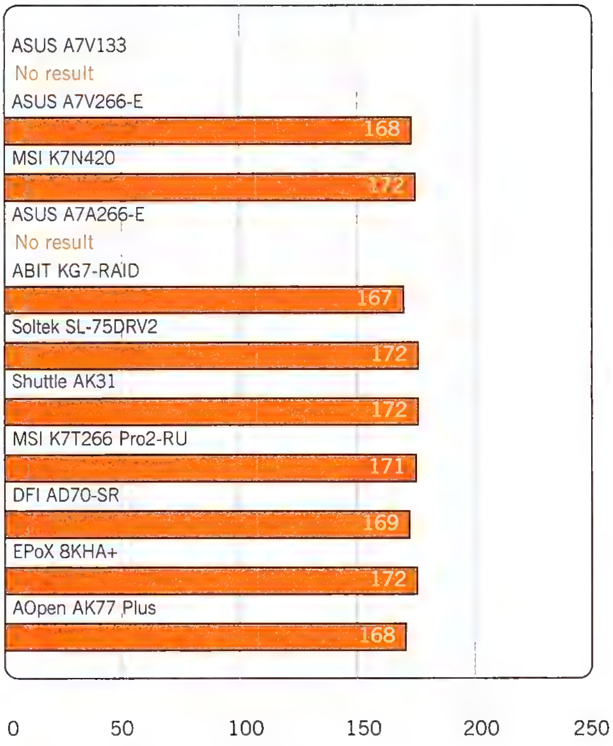
Tel (03) 9882 1811 Fax (03) 9882 1818
Australia IT 10 Railway Parade Camberwell Victoria 3124

Australia IT
ACN 088 274 195

Quake 3: Arena (CPU)



SYSmark2001: SYSmark rating



> **'. . . the difference between the A7V133 and the fastest DDR board ranges between 30 and 60%, depending on the tests.'**

Cheap and not so nasty

Things have definitely changed from the bad old days of negligible performance differences between DDR and SDRAM. From our results the difference between the A7V133 and the fastest DDR board ranges between 30 and 60%, depending on the tests. This is definitely a tangible performance increase and makes the general concept of DDR much more palatable than it was only a few months ago.

SYSmark2001 has again proved problematic; unfortunately, it would not finish running on the A7V133 or the A7A266-E. For the rest of the boards it is important to note the remarkable consistency in SYSmark rating. From the closeness of results is it difficult to say anything beyond the fact that all the boards excel in SYSmark, and that we are probably looking at a CPU limitation rather than a motherboard-based one.

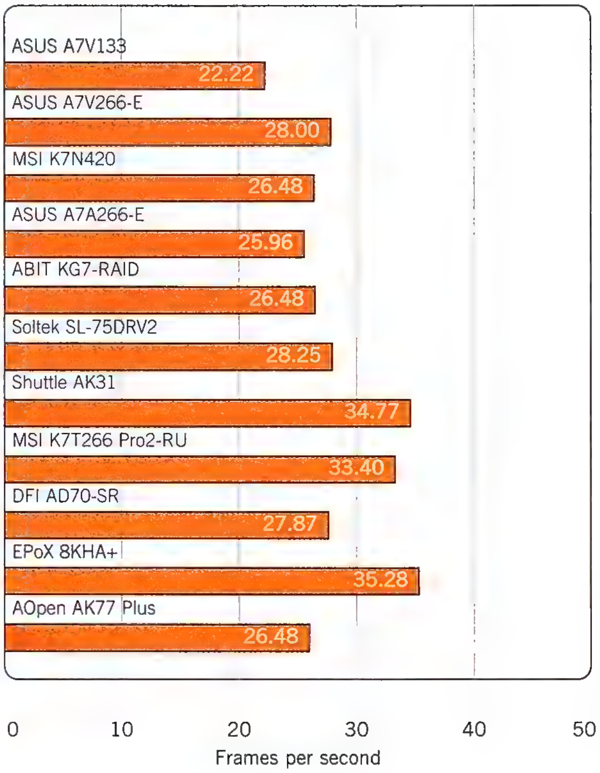
In Quake 3: Arena the bigger picture starts to emerge. The EPoX 8KHA+ takes a commanding lead in this test, beating the MSI K7N420 by the narrowest of margins. ABIT's KG7-RAID is worth a mention, as it came in ahead of the AK77 Plus and the A7V266-E in the tests, despite the use of an older chipset.

It is in the more intensive SPECviewperf tests that the gap between boards begins to open right up. Again the 8KHA+ manages to blitz all the other boards, with the Shuttle AK31 definitely the most consistent second placegetter. Even though it is still quick, the AOpen AK77 Pro falls behind the other boards, largely due to its rather conservative optimised default settings in the BIOS. Unfortunately, after several benchmark runs, we still could not get the MSI K7T266 Pro2-RU to run the DRV tests.

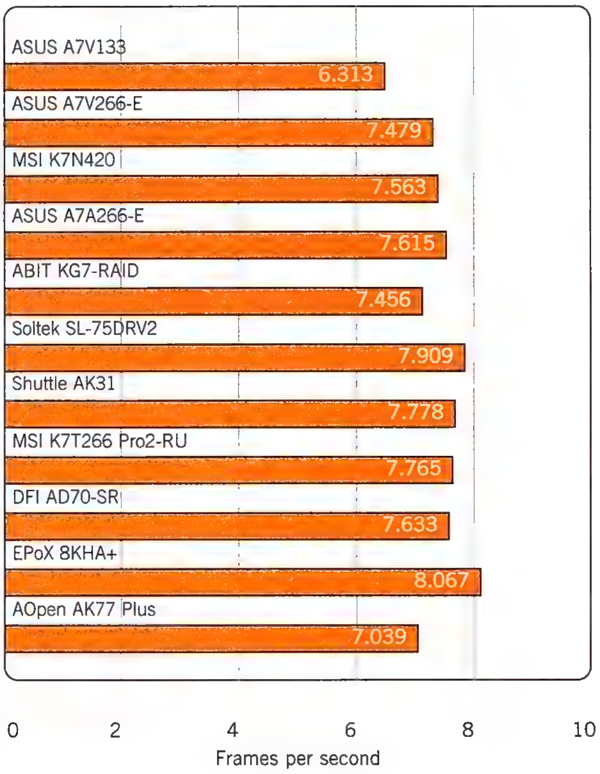
The obvious speed demon in all the tests was the EPoX 8KHA+. When combined with the huge range of tweaking options the board can only get quicker, but even at optimised defaults it beats all the other boards in every test. Plus it is one of the more competitively priced motherboards in our round-up. It is easy to see from this board why EPoX has earned a big following among the enthusiast and overclocker communities.

The other winner is the Shuttle AK31 3.0, which manages to rank in the top three boards in all our tests, even though it is the cheapest board in the round-up at only $184. For a company that has never really had a strong reputation for performance motherboards, the AK31, along with Shuttle's AV40R P4 indicate that this is a company to keep an eye on over the next few months.

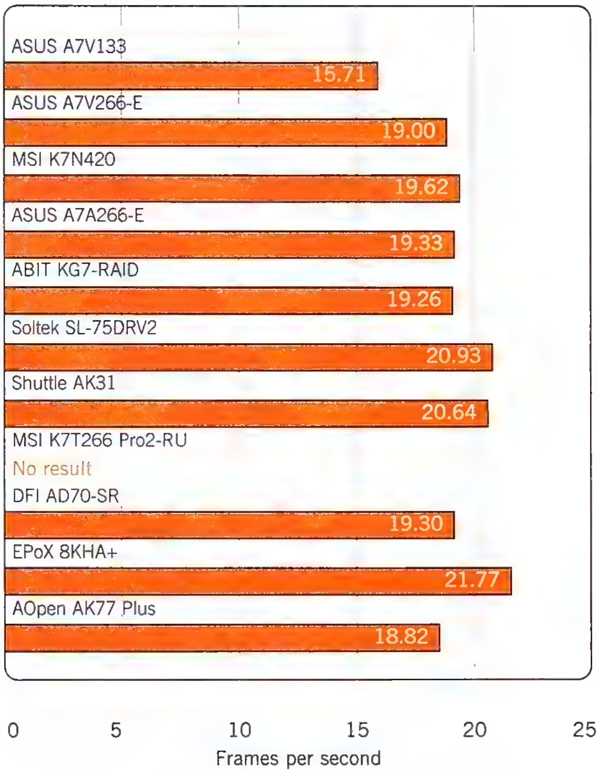
SPECviewperf DX



SPECviewperf Light



SPECviewperf DRV



Also of note is the MSI K7T266 Pro2-RU, which is the most feature-packed Athlon motherboard to enter the Atomic Labs. This combines with fast performance to deliver a motherboard solution for those who want it all. The other impressive boards are the ABIT KG7-RAID, which gives the competition a run for its money even though it's running an older chipset, and the ASUS A7A266-E, which actually delivers what we expected with the first SDRAM/DDR hybrid boards – that is, highly competitive DDR performance with the added convenience of SDRAM support.

DDR has come a long way in a fairly short time. The days of lacklustre performance at five times the price are behind us now, and there is a strong reason for setting aside those sticks of SDRAM and making a move. In the next few months we will start seeing PC-2700 (DDR333) chipsets appearing, but it is questionable whether the performance boost given by a higher frequency will happen at all. With the Athlon running on a 133MHz FSB and PC2700 RAM running over a 166MHz FSB the disparity in bandwidth raises questions about just how much it can boost system performance like it does with the effective 400MHz FSB of the Pentium 4.

So it is now time for everyone to rewire their brains. DDR is the way of the future and SDRAM just plain sucks. Now repeat that mantra a few hundred times. With performance gains of over 30% on SDRAM, a switch to DDR RAM strapped into a board like the 8KHA+ is one of the tastiest upgrade paths now available.

BELKIN NOSTROMO N50 SPEEDPAD
ARDWARE REV
TOMIC
BELKIN N
REVIEWS ●●●
ATOMIC
540540
REVIEWS ●●●
ATOMIC
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REVIEWS ●●●

Land of sunshine

Too much time in the Labs can cause an unhealthy troubleshooting obsession. John Gillooly develops a textbook case.

I am convinced that there is a hardware utopia where all components exist in perfect harmony; video cards work to their full potential from the start, sound cards never cause crippling IRQ conflicts, and obscure bugs and incompatibilities are things of fiction, talked about at night to scare small children – much like the bogeyman or Dr Derek Smart.

When those sleep-deprived hallucinations disappear, cold, hard reality hits. Given the sheer volume of flaky hardware interactions, it is amazing that any system works to its full potential at all.

The downside to getting our hands on the latest and greatest hardware is that a lot of the time we end up with little support when problems occur – and they do. At regular intervals. When you think about it, we should count ourselves lucky that a lot of the hardware works at all after the torturous journey it takes to get to the Atomic Labs. Despite the fact that a lot of products wing their way from Taiwan, packed inside a flimsy cardboard box, there are very few things that don't work. If a motherboard doesn't work, then it is a relatively easy thing to troubleshoot: swap in different components, search out the CMOS clear contact points, jab them with a screwdriver, swear quietly to yourself, walk away, come back, repeat, flick a few switches, try booting, decide it doesn't work and move on.

It is the products that do work that are the real buggers. Diagnosis of problems is often based on sneaking suspicion rather than directly observable fact, but it is more often than not correct. Also there is usually very little information about the product available and, apart from whatever white papers we get our hands on, the only real avenue of investigation is to coordinate a transcontinental bug hunt with the hardware manufacturer.

Often there is no time to do this, so it involves long periods of, often frustrating, tweaking and hardware swapping to identify the problem. The time it takes to diagnose the root cause of a problem is highly dependant on what type of component is being flaky.

Video cards are not too much of a problem; usually weird benchmark results can be easily checked by looking at the core and memory speeds, and then tweaking some BIOS settings. The real pains in the butt are motherboards. They can drive me nuts at times. Take this month's DDR motherboard round-up as an example.

When you look at a new chipset there is an expectation of flaky behaviour. But the DDR round-up added a new twist to standard events. After making a decision to test all the motherboards using optimised defaults, it was a given that there would be a reasonable spread of results. However, nothing prepared me for the fact that one of the KT266A boards in the review was ahead of the rest by significant amounts in all tests.

After a day or so of frustrating BIOS tweaking, reinstalling and repeat benchmarking, the potential problem emerged. It seems that there is a little known bug by which the combination of certain BIOS versions, Windows Me, VIA 4in1 drivers and GeForce3 cards can dramatically cut performance. Due to dumb luck, this managed to conform almost exactly to my test setup for the round-up.

The cure? Jump into the BIOS and open the AGP aperture up to 128MB – the problem disappeared. Sure enough, the motherboards all started benchmarking realistically after this, and the only lasting problem was the fragile veil of sanity left behind. These sorts of issues seem to be minor, but if left undiscovered they would have had a major skewing effect on the results, changing the final conclusions significantly.

This was not the first time that we had come across such a bizarre problem. The last time was when we looked at i850 motherboards for the Pentium 4. It came to light that one little, almost completely undocumented BIOS setting called COMPATIBLE_FPU_OPCODE or something similar, governed the behaviour of the floating-point unit (FPU) of the processor and, in most default configurations, actually led to a significant slowdown. This was because the setting controlled the FPU of the processor, so most of the motherboards that we were testing were actually running the FPU in software mode. Again, it was something that caused immense frustration, but by finding the problem it meant that our results were valid.

Hardware compatibility problems are common and have the uncanny knack of reducing one to a dribbling mess. Thankfully, by the time new hardware reaches you, the issues should be fully documented. If you are planning to buy some new hardware, it is probably worth the time spent doing a Google search to see if any such problems exist. Just think, tweaking a simple BIOS setting could be the cheapest upgrade you ever make.

Atomic benchmarks

Take a look inside the Atomic Labs testing procedures.

Here at Atomic it is our primary intention to give you the final word on the latest in hardware and PC technology. An integral part of determining the performance of a particular piece of hardware is benchmarking, and this is something we take very seriously in the Atomic Labs.

SYSmark2001

SYSmark is a product of the collaboration between industry group BAPCo (www.bapco.com) and MadOnion.com (www.madonion.com). It is the first of the next-generation application benchmarks and is designed to more accurately replicate the day-to-day workload that a system is subjected to. The benchmark focuses on Internet Content Creation and Office Productivity tasks in order to generate a final rating.

SiSoftware Sandra 2001 Professional

Sandra, from SiSoftware (www.sisoftware.co.uk), is a comprehensive benchmark and diagnostics utility. It contains dozens of special module applets that retrieve detailed information about the specifications and settings of a system, by polling each component's built-in firmware or BIOS. Sandra also features a small suite of synthetic benchmarks for specific components such as CPU, memory, CD-ROM and hard disk. It also features a burn-in wizard for stress-testing overclocked systems.

3DMark2000 Pro

3DMark2000 Pro from MadOnion.com is a powerful benchmark for testing Direct3D performance, and is the successor to the popular 3DMark99 MAX. Although it is a synthetic benchmark, it uses the advanced MAX-FX 3D engine from Max Payne, which is representative of the latest in Direct3D performance and technology.

3DMark2001 Pro

3DMark2001 Pro from MadOnion.com is the next progression of the popular benchmark. It also uses the MAX-FX engine and heavily emphasises DirectX 8.0 functions, including programmable shaders. The results are not comparable with results from 3DMark2000 Pro.

Video2000

Video2000 is another MadOnion.com product designed to test video card performance. It doesn't measure 3D performance, but instead focuses on visual quality and video decoding performance.

Quake 3: Arena AtomicMPC Demo

Quake 3: Arena (Q3A), from id Software, is the very popular first person shooter representing the latest in OpenGL gaming technology. Q3A has a built-in benchmarking utility and built-in demos that can test graphics card performance. These demos are fairly simplistic, and are not representative of the worst conditions that the game can offer to a graphics card. So we developed our own AtomicMPC Demo that pushes the hardware as far as possible.

Other benchmarks

Sometimes we need to break down the tests into more specific areas, such as hard disk performance, or a particular facet of 3D like T&L or SSE. For these specific purposes we can draw on a vast number of applications, games and dedicated benchmarks such as CD Speed 99, DisplayMate, Evolva, MDK2, Adaptec ThreadMark, Aquamark or Serious Sam. Whenever we use one of these special benchmarks we will outline the nature of the tests, the testing procedures and any settings we use. ▢

atomic testbench specs

There are two testbenches in the Labs: one for running AMD processors and one for Intel processors. Both run Windows Me, DirectX 8.0a or DirectX 8.0, Live!Ware 3.0 for Windows Me, and Detonator XP 21.83 drivers.

- **AMD Athlon XP 1800+ system – ASUS A7V133 motherboard** (CPU supplied by Legend Performance Tech, (08) 8401 9888)
- **Intel Pentium III 1GHz system – ASUS CUSL2 motherboard** (Both systems supplied by CASSA, www.cassa.com.au)
- **Intel Pentium 4 system – ABIT TH7 RAID motherboard** (Supplied by ABIT, www.abit.com.tw)

Common components

- **Transcend 128MB PC133 CL2 SDRAM** (Supplied by CASSA)
- **Transcend 128MB PC2100 DDR RAM** (Supplied by CASSA)
- **Samsung 256MB PC800 RDRAM** (Supplied by CASSA)
- **20GB Ultra DMA/100 7,200rpm hard disk drive**
- **Hercules Prophet II GTS 32MB** (Supplied by Guillemot, www.hercules.com)
- **Sound Blaster Live! Player** (Supplied by Creative Labs Australia, www.creaf.com)
- **ASUS 12x DVD-ROM drive** (Supplied by CASSA)

Benchmark settings

3DMark2000 Pro

- 1,024 x 768, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,024 x 768, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer

Quake 3: Arena AtomicMPC Demo

All tests use Quake 3 1.27g

- CPU: 320 x 240, maximum geometry detail, minimum graphics settings, high sound quality
- Graphics cards: 640 x 480, normal quality graphics settings, high sound quality
- 1,024 x 768, maximum graphics settings, high sound quality
- 1,600 x 1,200, maximum graphics settings, high sound quality

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A Match Made in Heaven. Introducing the SiS645 - with new computer"DNA" that delivers an amazing picture - perfect performance.

Silicon Integrated Systems SiS645 chipset, with leading DDR333 memory support and proprietary MuTIOL® technology enabling 533MB/s bandwidth throughput, offers the best in combined speed and quality, creating the ultimate computing experience.

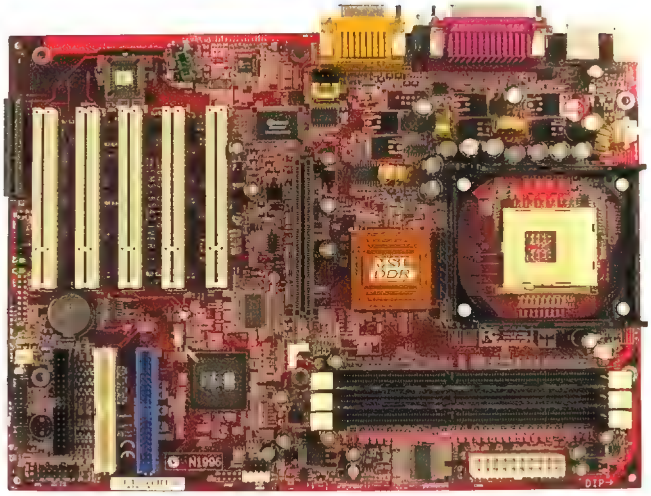
- *Support Intel Pentium® 4 400MHz System Bus*
- *Support DDR333/DDR266/PC133*
- *Support AGP 4X Interface*
- *MuTIOL® Delivering 533MB/s Bandwidth*
- *Integrated Fast Ethernet/Home Networking Controller with MII Interface*
- *Integrated Audio/Modem Controllers with AC'97 Interface*

Silicon Integrated Systems Corp.

www.sis.com

MSI 645-Ultra

John Gillooly watches SiS RAM the opposition.



Most people would agree that the SDRAM-based i845 chipset has been and gone with none of the fanfare that was expected from the first low-cost Pentium 4 motherboard solution. Intel's chipset was so eagerly awaited that the lacklustre performance of the Pentium 4 with SDRAM was a big disappointment to a lot of people. As Intel moves to remedy that with the i845 DDR chipset, the market is open for the third-party chipset manufacturers to fill the void.

VIA hasn't been able to get solid support for the P4X266, which has suffered from a concerted legal effort by Intel which has scared first-tier motherboard manufacturers away. Even with the recently announced P4X266A, which features an even faster DDR memory controller, VIA is doubtful to make a mark on the mass market until it sorts out the current licensing issues and related litigation with Intel

Enter SiS, who has a fully licensed Pentium 4 DDR chipset called the 645. The 645 is notable because it also marks the first appearance of PC2700 (DDR333) DDR RAM. Much as VIA championed the cause of PC2100 (DDR266), SiS is fully behind the new DDR333, and will be supporting it in most upcoming chipsets.

DDR333 is so called because it uses a double-pumped 166MHz frontside bus. Theoretically, the advantage of this is that the effective speed of 333MHz means that it is almost as fast as RDRAM (which runs at an effective 400MHz), but is cheaper and decidedly more licence-free.

One of the first 645 boards on the market is MSI's 645-Ultra. Coming on the now standard MSI trademark red PCB, with three DDR slots, five PCI slots and support for six USB ports, the board has less features than we usually expect from accessory kings MSI, but makes up for the lack of features in pure performance.

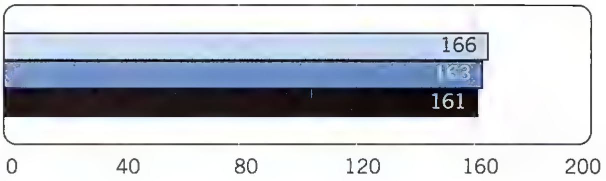
To test the 645 we compared it to an i850 reference system running 256MB of PC800 RDRAM and VIA's P4X266-based Shuttle AV40R running 256MB of PC2100 DDR RAM. All boards were tested under Windows Me using a 478-pin 2GHz Pentium 4 processor, with a 32MB Hercules Prophet II video card. In order to compare the results with previous tests, we used the NVIDIA 12.41 Detonator drivers rather than the newer Detonator XPs.

In SYSmark the results are incredibly close, but the 645-Ultra manages to snatch the lead from the other boards by the narrowest of margins. When we look at the breakdown of SYSmark results for the board it's clear that it is more than capable of supplying the bandwidth needed by the Pentium 4, with a very respectable score of 184 in the multimedia-intensive Internet Content Creation tests.

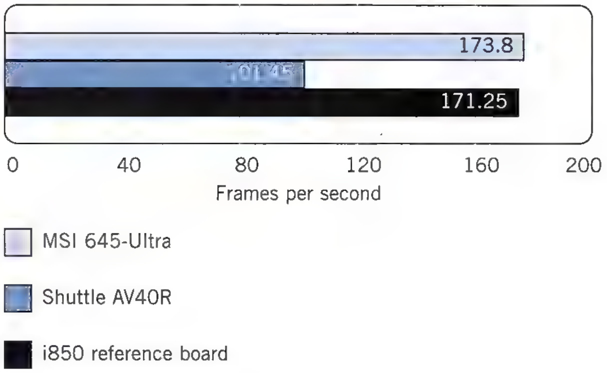
In Quake 3, the RDRAM favourite benchmark, the 645-Ultra also takes it by a nose. While both it and the i850 stay well ahead of the P4X266, the narrow margin does fall in favour of the 645-Ultra.

Although the performance difference between the i850 motherboard with RDRAM and the 645 board with DDR RAM isn't huge, the difference in cost means that the 645-Ultra is an infinitely more attractive solution. We're still waiting for the day when RDRAM becomes affordable. For those who want great performance for the Pentium 4 but are not prepared to shell out for an expensive RDRAM and i850 motherboard combo, then this is a blessing. With performance like this, saving money can be an absolute joy.

SYSmark2001: SYSmark rating



Quake 3: Arena (CPU)



SPECIFICATIONS

SiS 645 chipset, DDR333 support, 478 pin socket, Red PCB,
Web site: MSI Computer www.msicomputer.com.au
Supplier: MSI Computer www.msicomputer.com.au
Phone: MSI Computer (02) 9748 0070 **Price:** $285

atomic
9/10

Hercules Prophetview 720

With the ever increasing number of TFT screens hitting the market this year, it looks as if the days of CRT monitors are surely numbered. Image quality concerns and motion blurring are becoming problems of the past, and there is no denying the space-saving benefits of having a monitor that is only slightly wider than a book. LANing has never been so easy. These days you don't even need to be the child of a retired politician to afford one. It's not often we see a monitor arriving from Hercules, but they have burst onto the scene in style with the arrival of the Prophetview 720.

In terms of appearance, this TFT takes a minimalist approach. A plain, blue, plastic monitor surround is matched perfectly by the chunky, all-steel base. Several buttons on the right side of the monitor access the OSD, which contains a fairly average range of settings and options. The build of the facia seems a little bit flimsy, but is nowhere near as shoddy as some of the shockers we've broken – oops– dealt with in the past.

To test the display properties of the Prophetview 720, the faithful DisplayMate benchmark was dusted off. Throughout the majority of the colour tests, this monitor performed well. There was a slight inconsistency in one of the colour ramping tests, but nothing to write to Hercules about. At the darker end of the greyscale tests, performance looked to be less than perfect, but again it wasn't unbearable.

Considering this monitor is Hercules' debut effort at releasing a monitor, they deserve congratulations for putting out such a well-rounded product. If only it was a couple of hundred dollars cheaper, we'd have no hesitation recommending this as the budget TFT of choice.

SPECIFICATIONS

15in TFT monitor, 30ms pixel response time, 104° horizontal viewing angle

Web site: Hercules au.hercules.com

Supplier: Hercules au.hercules.com

Phone: Hercules (02) 8303 1823 **Price:** $1,119

atomic
7.5/10

Sony DCR-IP7

Is this the world's smallest digital video camera? Well, it can't be far away from the record. In terms of features per cubic centimetre, it's a definite winner.

The DCR-IP7 Network Handycam IP has 10x optical zoom, a digital image stabiliser, a fold-out LCD screen as well as an electronic viewfinder, and one of those cool InfoLithium batteries that tells you how much runtime remains. That's not so unusual.

What is a bit unusual is that this camera uses the new Micro MV digital video format, whose 12Mb/s data rate (compared with 25Mb/s for DV) lets it fit an hour of video onto a tape so small that it looks as if it should go in a microcassette dictation machine.

But the MPEG-2 video quality is still well above VHS grade, and there are no nasty compression artefacts on pans or zooms.

There's a Memory Stick slot for 640 by 480 still shots and variable resolution MPEG clips. And there's USB connectivity for moving things to and from the Memory Stick. And i.Link (small-plug FireWire) for moving digital video to and from the tape. And composite and Y/C analog input/output.

What makes this camera really unusual is that it's got Bluetooth wireless networking built-in, so it can talk to

Bluetooth-enabled mobile phones and use them to access a dialup Internet account. Then you can use the camera to browse the Web, and send and receive email with image and video attachments.

Unfortunately, the little screen and Game Boy-esque interface make the Web and email painful to use. And nothing but Sony's own Fisher-Price editing software understands the Micro MV video format. You should be able to just hook the camera up via any of its interfaces and browse it like a drive, or access it via an HTTP interface, but you can't.

So this thing's a super-expensive gadget-show special. It's Sony showing off.

I'd take one for free, though.

SPECIFICATIONS

i.Link, USB, Bluetooth, Memory Stick, email client, Web browser

Web site: Sony www.sony.com.au

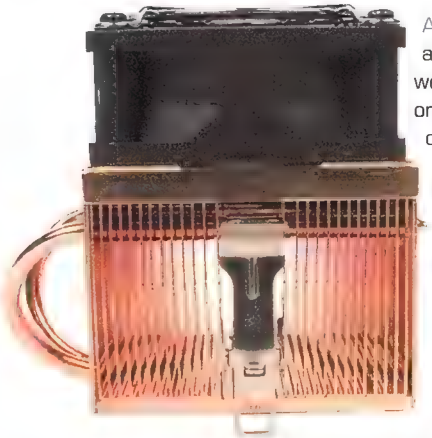
Supplier: Sony www.sony.com.au

Phone: Sony (02) 9887 6678 **Price:** $4,499

atomic
5/10

atomic HOT

Cooler Master HHC-001



As the product shots attest, this is one weird-arsed HSF. Not only does it have more copper than a dwarven mineshaft, there's also two pipes coming out of one side. These aren't carry handles to lug this heavy beast around, but are actually heat pipes. And no, that doesn't mean you can smoke hashish with this thing while it cools your CPU. Heat pipes are a novel way of transferring heat from one point to another. The HHC-001 manages to use very thin copper fins, as the top section of the heat pipe acts as a support. A 6,800rpm fan makes this one of the noisier HSFs around, but you're probably already deaf from your rowdy FOP-38 anyway.

We tested the HHC-001 on an MSI K7T 266 Pro2-RU motherboard with an Athlon XP 1800+, and used MSI temperature monitoring software. After 30 minutes of SiSoft Sandra 2001 CPU burn-in mode the load temperature was recorded, before leaving the PC at the desktop for another 30 minutes and recording the idle temperature. Ambient room temperature was a chilly 20°C for the testing, and a WBK-38 (the second coolest HSF by 1°C in our recent round-up) was used for comparison. After making the CPU sweat for 30 minutes, the load temperature was measured at a cool 36°C. When we compared this to the WBK-38's temperature of 42°C, Atomic had a new favourite heatsink. The idle temp of 33°C is outstanding compared to the 38°C that the WBK-38 reached.

These results attest that the HHC-001 is easily the best HSF we've had the pleasure of testing. It was even one of the simplest units to mount! WOOt! At $125, this heatsink is definitely aimed at the elite PC builder. Thankfully, the sterling performance delivered by its innovative design makes it $125 well spent.

SPECIFICATIONS

6,800rpm fan, 36.11 CFM fan, 80 x 60 x 69mm, unique heat pipe construction

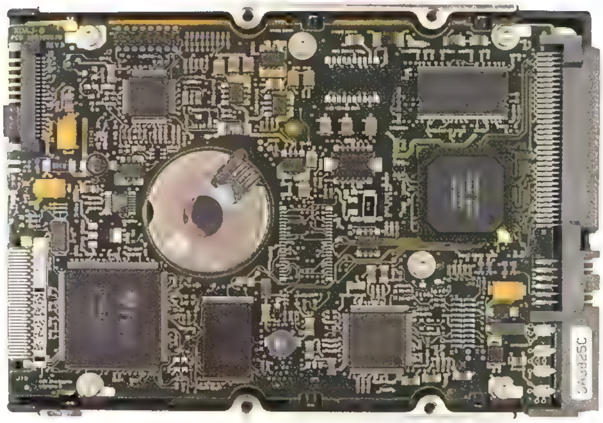
Web site: Cooler Master www.coolermaster.com

Supplier: Protac www.protac.com.au

Phone: Protac (02) 8748 8899 **Price:** $125

atomic 9/10

Seagate Cheetah X15 36LP



The Cheetah series from Seagate has established a strong reputation as being a record-breaking line of hard drives. They were the first to reach spindle speeds of 10,000rpm, which was then shattered when they became the first to reach 15,000rpm. As we all know (well, you do now), spindle speeds are one of the main factors in increasing the rate that data is transferred on to or off a hard drive. This isn't the only factor though, as seek times play an important part in this procedure.

The new Cheetah X15 36LP from Seagate seems to have the best of both worlds in this regard; a high spindle speed of 15,000rpm combined with very low seek times. We installed the 36LP into an ABIT KG7 RAID motherboard, powered by an Athlon 1800+ with 128MB of DDR RAM, to find out just how fast this Cheetah can run. To determine the seek time of the drive we used TCD Labs' HDTach. This actually reports the access time of the drive, which is a combination of the rotational latency and the seek time, giving a much more meaningful result. The 36LP benchmarked as having an access time of 5.8ms. Compare this to the 9ms or so of other SCSI drives, and it's obvious that the Cheetah can get to the information you need sooner than the rest of the pack.

To test the sustained data transfer rate of the drive, we used Adaptec's ThreadMark synthetic benchmark. The 36LP managed to attain a sustained data transfer rate of 20.59MB/s, which is again a very respectable effort. This kind of performance doesn't come cheaply, with the 18GB model retailing at $757 and the 36GB at a whopping $1,210. It's because of this price that we ended up settling on a 7.5 out of 10, instead of a 9.

If performance is your number one concern when purchasing your next hard drive, and price isn't an obstacle, you'll be hard-pressed to find anything that can touch the Cheetah X15 36LP. Now if only it came wrapped in a faux Cheetah skin cover, we'd all be getting them for our home PCs.

SPECIFICATIONS

3.6ms seek time, 5.6ms access time, Seagate 3D Defense system, SeaTools diagnostic application

Web site: Seagate www.seagate.com

Supplier: Seagate www.seagate.com

Phone: Seagate (02) 8748 2700 **Price:** $1,210

atomic 7.5/10

Athletes train and fuel their bodies to achieve maximum performance. Nutritionists advise us to eat a well balanced diet to maintain a healthy heart, body and mind. But, how do we go about improving our overall performance?

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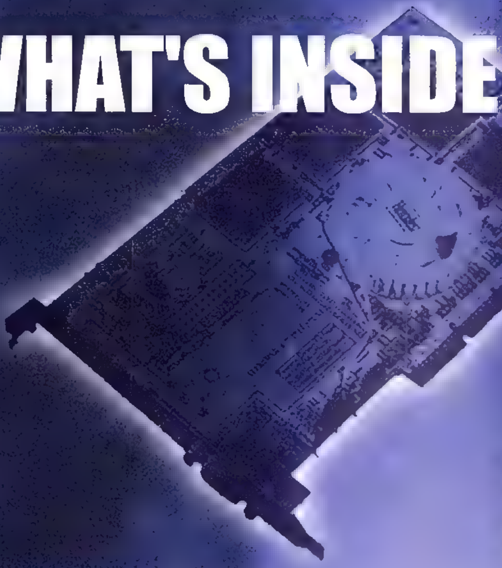
IT'S WHAT'S INSIDE THAT COUNTS



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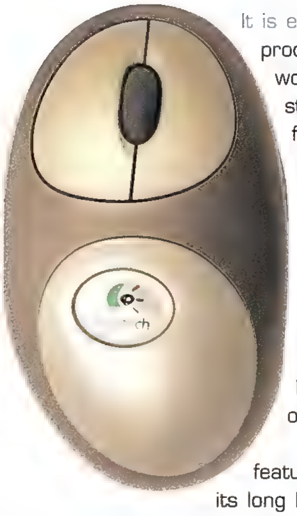
Logitech Dual Optical



It is easy to get cynical about some products. The wide array of weird and wonderful extra features that get strapped onto mice are prime fodder for those of us who wonder whether we actually need 17 buttons, force feedback and horizontally opposed scroll wheels. With this in mind, the initial impressions of the Logitech MouseMan Dual Optical seemed to revolve around a mental picture of some marketing guys going 'I know! Let's put two sensors on it – no-one has done that.'

You read it right: the major feature of Logitech's latest in its long line of mice differentiates itself from the rest of the market by having two 800dpi optical sensors mounted on the base. The actual mouse design is almost identical to the Wireless MouseMan Optical that was released earlier this year, but it uses a USB or PS/2 adaptor for connection.

The premise behind strapping two optical sensors onto the mouse is increased precision. By sampling movement twice, the mouse should eliminate the glitches seen when using an optical mouse, such as twitch gamers moving to fast for the mouse to keep track. Similarly, snapping a crosshair to a certain point on your screen or navigating through folders really quickly should both be no-brainers.

The scariest thing is that in practice the mouse is really smooth. As long-time optical mouse fans, we were surprised at just how slick and accurate the MouseMan Optical is. Even at ultra-twitchy levels of mouse sensitivity the loss of tracking that occasionally plagues first person shooters seemed nonexistent.

We don't know whether this is down to having two sensors, or whether one would deliver just as well. But this is perhaps the smoothest, slickest mouse we've used to date. And it has the glowy red base missing on some more recent optical models.

SPECIFICATIONS

Dual-800dpi optical sensors, four configurable buttons, scroll wheel, USB connection with PS/2 adaptor

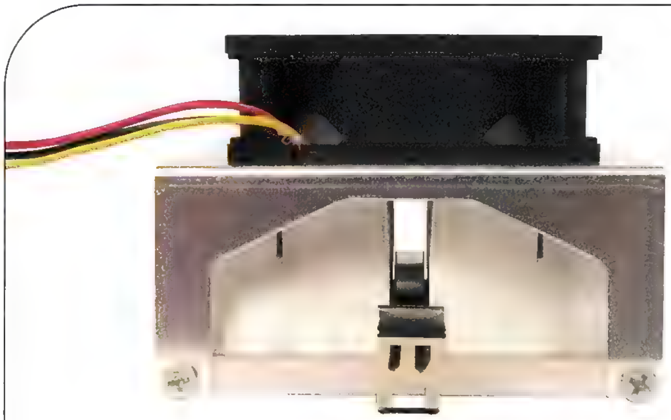
Web site: Logitech www.logitech.com

Supplier: Logitech www.logitech.com

Phone: Logitech (02) 9972 3711 **Price:** $99

atomic 9.5/10

Bitspower NP80D HSF



Ever heard of skiving? No, it's not an extreme sport combining skiing with diving undertaken by Pepsi drinkers. It's the term used to describe the carving out of a heatsink from a single piece of metal. How does this benefit a heatsink? The first and main advantage is that the fins of the heatsink do not have a heat-restricting join to the heatsink's base. The second is that the fins are much sharper at their end point, helping to lower air resistance and thus increase airflow.

The NP80D shuns the all-copper construction becoming increasingly commonplace in heatsinks; instead, it uses vanilla aluminium. To help keep the height low, curved fins are used as well as a 20mm deep fan. However, it still has a large footprint of 80 x 60mm, so if your CPU socket is as cluttered as a soup kitchen in the Bronx on Christmas day you'll have to look elsewhere. The fan spins at around 5,500rpm, putting it in the middle of the pack in terms of acoustic output – not brain-numbingly noisy, but still not quiet.

We installed the NP80D onto an MSI K7T 266 Pro2-RU motherboard with an Athlon XP 1800+ processor, using MSI's temperature monitoring software to record the results. Installing the HSF was a total cinch, requiring neither the use of a screwdriver nor the scraping of a single knuckle. As per our standard HSF tests, SiSoft Sandra 2001 CPU burn-in mode was run for 30 minutes before the load temp was measured, before leaving the PC at the desktop for another 30 minutes to measure idle temps. A GlobalWIN WBK-38 (one of the top performers in our HSF round-up several issues back) was also tested to compare with the NP80D, with ambient room temperature at a constant 21°C.

The NP80D reached 45°C under load while the noisier WBK-38 reached 43°C. Not bad for a medium noise level HSF. Idle temperature for the NP80D was the same as the WBK-38 at 39°C. From these results, it's clear that the NP80D is one of the best heatsink fans around for those who can't tolerate the high-pitched whine of a 6,800rpm fan and don't want to spend the large amounts necessary for a copper beast.

SPECIFICATIONS

5,500rpm fan, 28.95 CFM fan. Weight: 260g. Noise: 41.5 dB/A

Web site: Bitspower www.bitspower.com

Supplier: Aus PC Market www.auspcmarket.com

Phone: Aus PC Market (02) 9817 2899 **Price:** $44

atomic 8.5/10

Your computer never sounded so good.

Finally, your home computer doesn't have to sound like one, thanks to Yamaha's unique Multimedia Home Entertainment system. The Yamaha AP-U70 Multimedia Amplifier simply plugs into your computer via USB cable, and accommodates your audio equipment and speakers via standard hi fi connections.

Instantly you can enjoy all of your favourite movies, music and games the way the sound was intended to be played and heard.

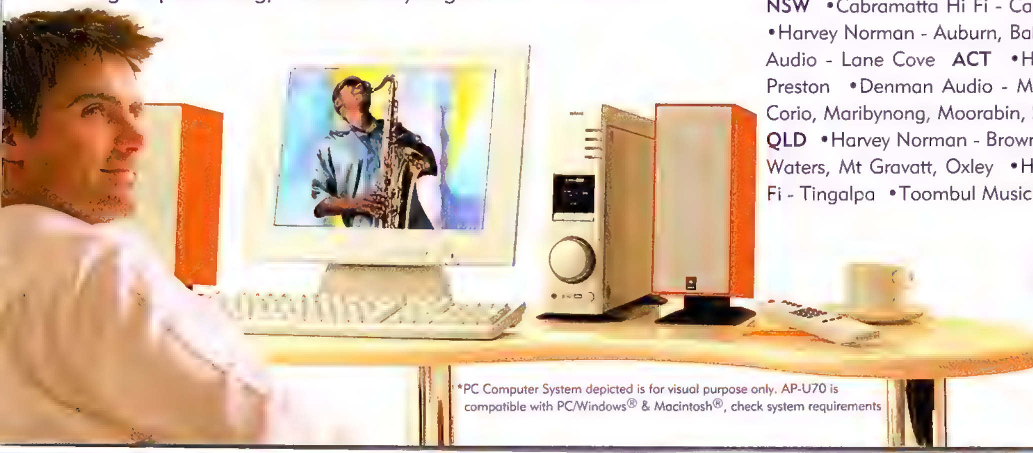
The AP-U70's versatility is amazing: set up your own private home theatre utilising the same digital technology as Yamaha's best home theatre amplifiers, with Cinema DSP Digital processing, Virtual Dolby Digital and DTS sound.

Play games with more dynamic sound, listen to high-quality Internet music and even record and edit your musical selections with a very cool graphic user interface.

The AP-U70 also has great connectivity for external sources such as DVD, CD, CDR, cassette, MP3 or MD player, and is available with Yamaha's compatibly designed NS-U30 speakers.

Thanks to Yamaha, now is the best time to upgrade your computer sound. For further information or stockist details simply call: **1800 682 705**

The AP-U70 is now available at the following participating stores: **NSW** •Cabramatta Hi Fi - Cabramatta •Haberechts Retravision - Albury •Harvey Norman - Auburn, Balgowiah, Liverpool, Moore Park •Len Wallis Audio - Lane Cove **ACT** •Harvey Norman - Fyshwick **VIC** •Brashs - Preston •Denman Audio - Melbourne •Harvey Norman - Cheltenham, Corio, Maribynong, Moorabin, Sydenham **SA** •Challenge Hi Fi - Prospect **QLD** •Harvey Norman - Browns Plains, Bundaberg, Everton Park, Kawana Waters, Mt Gravatt, Oxley •Hoppers Sound Centre - Gympie •Todds Hi Fi - Tingalpa •Toombul Music -Toombul.



*PC Computer System depicted is for visual purpose only. AP-U70 is compatible with PC/Windows® & Macintosh®, check system requirements

YAMAHA

www.yamaha.co.jp

NaturalPoint TrackIR

One of the great things about the PC is the way its components are often used in a manner they were not originally designed for. Take the NaturalPoint TrackIR for example; originally designed to assist people with disabilities, it now looks to be the hot new item for simulation fans.

The TrackIR functions as a replacement for your mouse. Tilting your head upwards moves the mouse cursor upwards, rotating your head left makes it move left, and so on. The unit consists of a Webcam sized infra-red camera that sits on top of your monitor, and the user attaches a reflective dot approximately 5mm wide with a sticky backing to their forehead. There are 40 of these dots included in the box, which should last you over a year, and replacements are available for a pittance. The speed at which the cursor moves is fully configurable, and has several different modes of operation. We fired up IL2 as this game has a full virtual cockpit with mouse look, which means you can pan your pilot's view around the cockpit with your mouse.

After around 30 minutes of toying with the settings, we had the device working perfectly. The result was the closest to a true VR experience we've ever had on the PC. Tracking bogies became incredibly simple and intuitive; the need to use the game's padlocking mode became obsolete. With the mouse speed set to its fastest, a small rotation of the head to either side meant that checking your six became nearly instantaneous. Situational awareness improved tenfold, although there was a slight problem with keeping the view perfectly centred forwards when it came time to let loose with the guns. Unfortunately, the device isn't quite precise enough to use in first person shooters. But when it comes to simulations that feature a virtual cockpit with mouse look, the TrackIR is the ultimate view control system; both effective and simple to use with the added bonus of a very reasonable asking price.

SPECIFICATIONS

IR tracking unit, 40 reflective dots, 4ft USB extension cable, monitor mount

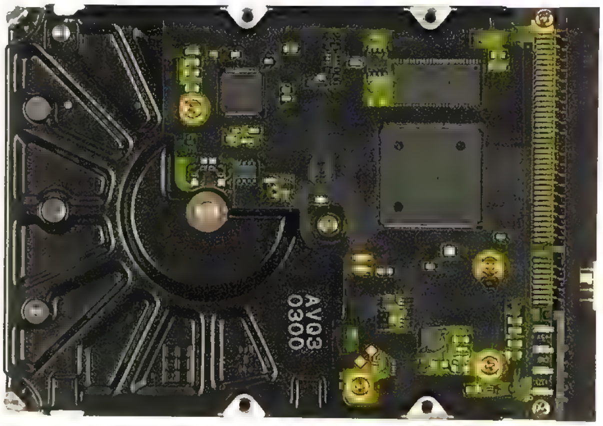
Web site: Natural Point www.naturalpoint.com

Supplier: Ability Tech www.abilitytech.com.au

Phone: Ability Tech (02) 9907 9736 **Price:** $240

atomic
9/10

Maxtor D740X-6L



Every time a speedier version of the ATA hard drive interface is released, the actual performance increase is about as massive as a Posh Spice concert ever since her recent miming debacle. What is the point of increasing the interface when the internal mechanisms of the drive can't supply anywhere near enough data to utilise it? Regardless of this disparity, the Ultra ATA/133 standard has now hit the market, promising a maximum theoretical data transfer rate of 133MB/s. Yeah, right. The first ATA/133 hard drive to hit the Atomic Labs is the Maxtor D740X-6L.

The 7,200rpm spindle on this drive is powered by Maxtor's 'Quiet Drive Technology Plus', which uses fluid dynamic bearing motors to keep the noise levels down. We didn't notice any of the usual whirs and clunks when testing the D740X-6L, which many older drives are plagued with.

We used the Ziff Davis' WinBench 99 disk tests to bench this drive. We installed the drive into a motherboard with an integrated ATA/133 controller, alongside a 2GHz Pentium 4 and 256MB of RDRAM. Due to NDA restrictions we can't tell you which motherboard was used, as it's not set for release for another couple of months. For comparative purposes, we also benchmarked our reference IBM ATA/100 Deskstar hard drive.

The most relevant test result was the disk transfer rate. The Maxtor posted a result of 41,200 thousand bytes per second, while the IBM posted a result of 37,200 thousand bytes per second, giving the Maxtor an impressive data transfer rate.

With a competitive price of $599, a three-year warranty and respectable performance figures, the Maxtor D740X-6L will be a lovely home for all of your ones and zeros.

SPECIFICATIONS

Ultra ATA/133 interface, 7,200rpm, 2MB buffer, Quiet Drive Technology Plus

Web site: Maxtor Australia www.maxtor.com

Supplier: Maxtor Australia www.maxtor.com

Phone: Aus PC Market (02) 9817 2899 **Price:** $599

atomic
8/10

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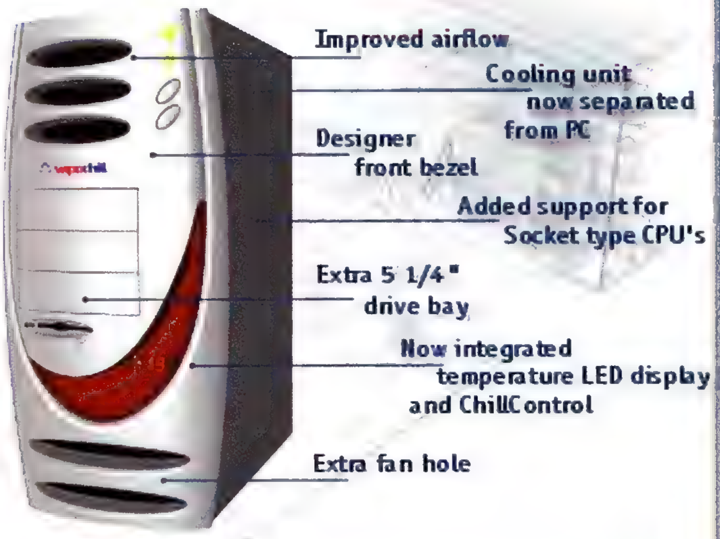
in one leap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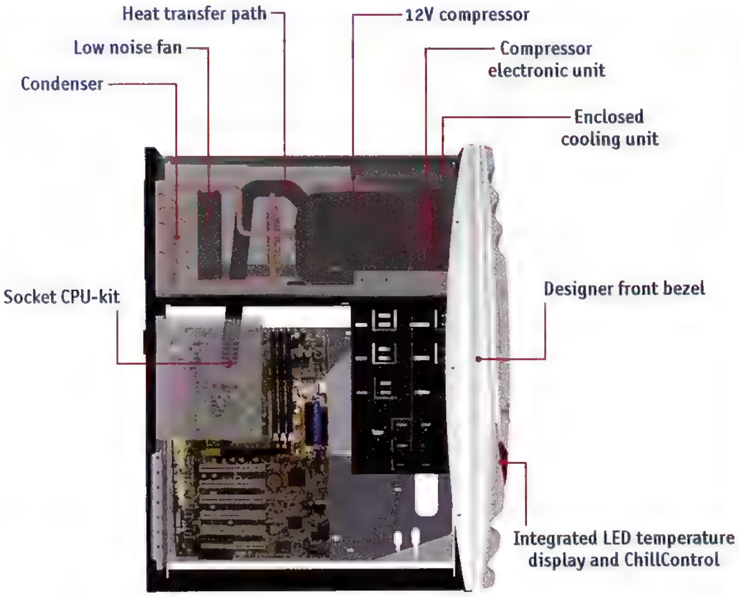
Extra fan hole



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TDK Tremor S150 speakers

With two super-thin satellite speakers and a tubular subwoofer, this speaker system should suit anybody's computer room décor.

The S150 satellite speakers are less than 30mm deep, because they use NXT-technology flat-panel drivers. This gives them a broad, airy sound that does most computer audio no harm at all, and means you don't have to fiddle with the speaker placement. The satellites come with both desk stands and self-adhesive wall or monitor brackets.

The S150 system has a 75W RMS power rating. The subwoofer has a ribbed aluminium back panel to serve as an amplifier heatsink, so this system should be able to play loud all day without failing a smoke test.

The power switch is on the subwoofer, but you shouldn't need to flick it too often; the S150 will go to standby mode after a minute or three with no signal.

The subwoofer's not a giant disco bass monster, since it's only got a pair of 3in drivers in it – one at each end. TDK quotes its bass as going down to 50Hz; but its useful response peters out above 70Hz, just like every other little multimedia speaker subwoofer.

As these things go, though, the Tremor sub is good enough. At least it doesn't have the big buzzy resonance peak that many small vented subwoofers use to fool people into thinking there's some serious bass to be had.

The S150's setup process is foolproof. The plugs and sockets are colour-coded, and there are no spring terminals for speaker wires, so you can't accidentally wire one or both satellite speakers out of phase and foul up your sound.

The volume, treble and bass controls on the right satellite speaker are tiny thumb wheels, which look elegant but are awkward to use. And the S150 also isn't without competition at its $249 price point.

That said, this is still a great looking, good sounding and not-too-expensive speaker system.

SPECIFICATIONS

Three-piece sub/sat speaker system with 75W RMS power rating, super-thin flat-panel satellite speakers

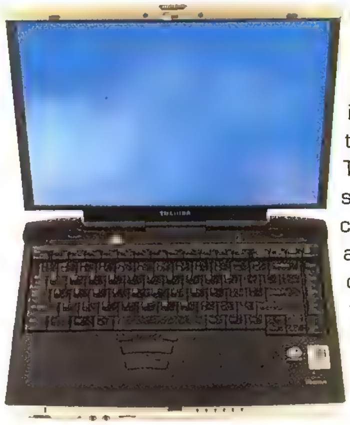
Web site: TDK www.tdk.com

Supplier: All good electrical stores

Phone: N/A **Price:** $249

atomic **7/10**

Toshiba Tecra 9000



The terms 'water-cooled' and 'magnesium-alloy case' do not usually conjure up images of a notebook, but the new Tecra 9000 from Toshiba is far from your bog standard notebook. With a combination of stylish looks, accessories as far as the eye can see, and some very funky technology, the Tecra reinforces Toshiba's position as an innovator in the notebook market.

The machine is impressive if you look at it purely from a technical standpoint. The centrepiece is the advanced cooling system, which uses a three-stage design incorporating a heat pipe (which is very similar to the one Toshiba developed for the PlayStation2), cooling fan and the actual chassis of the notebook itself, which is made of magnesium-alloy in order to improve heat transfer.

Packed with features such as a Secure Digital card slot, inbuilt 802.11b wireless LAN hardware and a slim DVD-ROM/CD-RW combo drive, the Tecra 9000 is a great accessory for those who love to be able to jam as many extras as possible into their portable PC.

The Tecra 9000 utilises a 1,066MHz Mobile Intel Pentium III processor-M, which translates to Tualatin-cored Pentium III in normal speak. Graphic output is via an integrated S3 Super Savage chip, all running on a multi-level Intel 830MP-based motherboard. It also sports a 30GB hard drive, 256MB of PC133 SDRAM and a 14.1in TFT screen.

Due to the highly specialised nature of Toshiba's standard notebook operating system image, we were unable to get full SYSmark2001 results; however, in the Internet Content Creation tests it achieved a very respectable score of 120. The notebook is not designed for 3D gaming, but excels in day-to-day tasks.

The Tecra 9000 is by no means a cheap notebook, but it does incorporate the leading edge notebook technology. For those after a business notebook, this is definitely a stand-out in terms of looks, performance and features. The only place it falls down is 3D gaming. For that we will have to wait for the potentially amazing NV-17M Mobile, GeForce3-level graphics chipset from NVIDIA, which should be winging its way to us soon.

SPECIFICATIONS

1,066MHz Mobile Pentium III processor-M, 256MB RAM, 30GB HDD, Super Savage video, DVD/CD-RW combo drive

Web site: Toshiba www.isd.toshiba.com.au

Supplier: Toshiba www.isd.toshiba.com.au

Phone: Toshiba 1800 021 100 **Price:** $8,332.50

atomic **8/10**

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atomic HOT

DVD Region X

DVD region encoding is perhaps the most disliked feature of the DVD format. This was implemented solely so the soulless, blood-sucking entities, otherwise known as movie studios, could control exactly when and how a movie is released to DVD around the world. In other words, it's all about profits, and it has become the bane of many a DVD owner.

It means that those who wish to purchase titles from the larger overseas selections haven't been able to do so, unless they void their DVD player's warranty by installing a mod chip. This unlocks the region restrictions, but means if anything goes wrong with your DVD player, you're going to be up shit creek without a paddle. For PS2 owners, the DVD Region X Key does the same thing without having to tinker with the box's innards, thus keeping your warranty intact. The DVD Region X pack consists of a boot CD and an 'X-key'. After inserting the X-key into the number 1 memory slot of the PS2, the boot CD is run. Voila, your PS2 is now region unlocked. Pretty darn simple, eh?

To test the DVD Region X, we tried playing five DVDs from various regions around the world in an Australian PS2. Normally the PS2 would take a single look at one of these discs before spitting it out in a fit of contempt. We also tried a mixture of NTSC- and PAL-format DVDs. To our delight, the DVD Region X allowed us to play all of these discs without a single problem.

At an asking price of $60, the DVD Region X is cheaper than the standard price of $100 or so that a chip modification will set you back, with the added bonus of an intact warranty. Combine this with its excellent success rate and simple installation, and this device is something PS2 DVD aficionados simply shouldn't live without. ▢

SPECIFICATIONS

X-key fits into memory slot, one boot CD, NTSC and PAL compatible

Web site: Code Junkies www.codejunkies.com

Supplier: The Gamesmen www.gamesmen.com.au

Phone: (02) 9580 9888 **Price:** $60

atomic
9/10

Belkin Nostromo n50

If your PC keyboard feels like a five-manual pipe organ when you play games, a dedicated left-hand game control device is what you need to enhance your ability to do unto others in style. Belkin's Nostromo n50 SpeedPad puts an ergonomic cluster of highly configurable game controls under your left hand's fingers (so left-handed people need not apply). And it does it for a hair less than $70. The n50 connects to a PC via USB, and its Windows support software comes with pre-built control configurations for a plethora (yes, El Guapo!) of games. If what you want to play isn't on the list, you can of course make your own configuration from scratch.

Three LEDs on the corner of the gadget show you which of three quick-select configurations for a given game you're using, and the n50 software will pick the right configuration to suit each game you run.

You can bind any of the n50's ten buttons and any of its eight control pad directions to any single key you like, or to a complex multi-keystroke macro.

Macros can even include delay time. This makes it easy to knock together those perfectly tuned first person shooter spin-fire-leap combos, which encourage other players to accuse you of cheating. Which, arguably, you are. But never mind.

The throttle wheel on the n50 can be re-bound, too; to a mouse axis or to rudder functions, for example. And everything falls quite easily to hand; the ten keys are comfortably in reach for anybody who doesn't have very small or amazingly large hands, the throttle's pretty easy to roll back and forth with your index finger, and the eight-way pad's right under your thumb. The pad's feel is rather soft and squishy, but it works.

The n50 isn't very heavy, but its rubber feet keep it stable on your desk, and it's solidly constructed.

Some left-hand controllers have too few buttons; some have too many. This one seems just right, and it doesn't cost a fortune either. What's not to like? ▢

SPECIFICATIONS

Auxiliary programmable game control gadget with ten keys, one eight-way pad and one throttle wheel

Web site: www.belkin.com

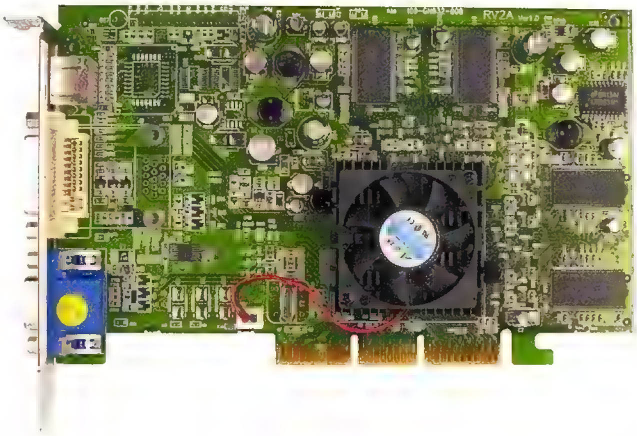
Supplier: www.belkin.com

Phone: (02) 4325 4666 **Price:** $69.95

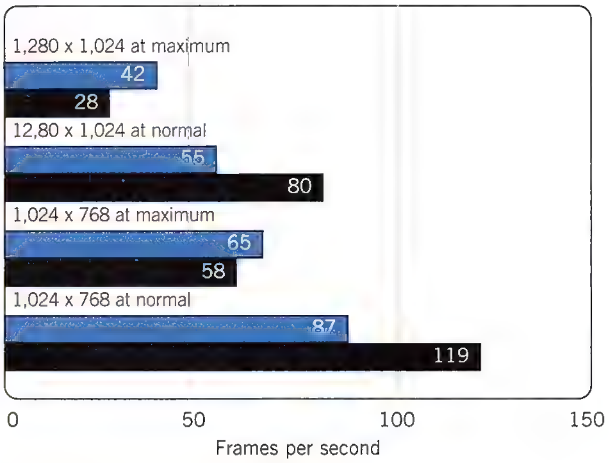
atomic
8/10

Radeon 7500 Evil Master

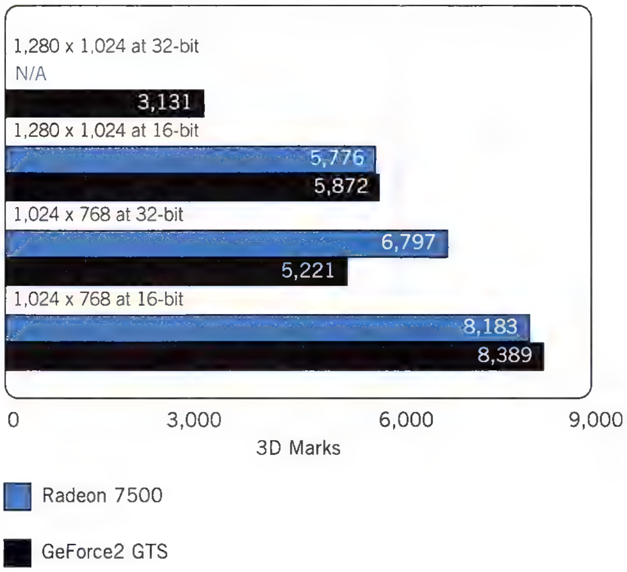
But what is it the master of, asks Bennett Ring?



Quake 3: Arena AtomicMPC Demo



3DMark2000



The Evil Master. Oh dear. We're not even going to contemplate what substance the marketing guru who thought of this video card's name inhaled before coming up with it. Regardless of the shockingly tacky name, the Radeon 7500 looks to be one of the next-generation ATI products that might topple the dominant position NVIDIA has held ever since the demise of 3dfx. Which to the social revolutionists at Atomic can only be a damn good thing.

For all intents and purposes, the 7500 is simply a higher speed version of the original Radeon. The main difference is the move to a 0.15 manufacturing process, which has enabled a sizeable increase in the core and memory speed. The core speed has increased from the original Radeon's 183MHz to a zippy 270MHz, while the DDR RAM memory has moved from a sluggish 183MHz to a respectable 230MHz. Using 64MB of DDR RAM with a 128-bit interface, the 7500 has an impressive total memory bandwidth of 6.9GB/s, comparing very favourably with the GeForce2 GTS's 5.2GB/s. So, in theory at least, the 7500 should be able to keep up with the GTS at higher resolutions. But you know what the words 'in theory' imply.

Hardware T&L is supplied via the Charisma Engine, and multiple monitor support is also included – something its NVIDIA counterpart is missing. ATI's Video Immersion technology is also included, providing some of the best video de-interlacing to be found in a home video card.

To test the performance of the 7500, we hooked it up with an Athlon XP 1800+, an ABIT KG7 RAID motherboard and 256MB of DDR RAM. Our Hercules 32MB GeForce2 GTS was also benchmarked for comparison.

As the 3DMark2000 results show, the 7500 excels at Direct3D performance. In 16-bit colour, it came within a mosquito's pecker of the GTS, but left it choking in its dust in 32-bit colour. Strangely, we couldn't get the 7500 to complete the benchmark in 1,280 x 1,024 at 32-bit colour. The Atomic Quake 3: ArenaMPC Demo showed the most interesting results, with the 7500 badly lagging behind the GTS in 16-bit colour but thoroughly trouncing it in 32-bit colour. We assume the woeful 16-bit performance is purely a driver problem, as the 7500 hardware should be capable of better than GTS performance.

Serious Sam exhibited the same behaviour as Quake 3: Arena; slower than the GTS with 16-bit colour (but not by as much as in Q3A) and faster with 32-bit.

We've said it before and we'll say it again – without decent driver support it doesn't matter how powerful a piece of hardware is. Until ATI realises this, we won't be comfortable recommending any of its products over an NVIDIA product with similar specifications. ▢

SPECIFICATIONS

64MB DDR-RAM, HydraVision multiple monitor support, Video Immersion de-interlacing, 4x AGP

Web site: www.australiait.com.au

Supplier: www.australiait.com.au

Phone: (03) 9882 1811 **Price:** $395

atomic
8/10

FROSTY

Audience with the gods

id Software's head honcho, Todd Hollenshead, is subjected to an Atomic mind meld with Bennett Ring.

It's not often that Todd Hollenshead, CEO of id Software, tours Australia granting interviews to the gaming press. So we jumped at the chance to interview Todd as he toured our sunburnt country to pimp id's latest and, by the looks of it, greatest game, Return to Castle Wolfenstein (RTCW). After making our way past several leather-clad Nazi dominatrixes and genetically mutated freaks, we settled in to pick the brains of one of the gaming industry's most influential and well-known figures.

The interview began with a brief run-through of RTCW's single-player mode, and to say we were impressed would be a massive understatement. It's taken two-and-a-half years since the release of the Quake 3: Arena (Q3A) engine to finally release a game worthy of its beauty, but it looks as if the wait has been worth it.

After we scraped our jaws off the floor it was time to pick the brains of id's main man (perhaps only in title, as we all know Carmack is the über-god). Given that Q3A is perhaps the most prolific OpenGL benchmark on the planet, we had to ask if id thought RTCW might become the next big thing for tweakers. According to Todd, this isn't likely: 'I don't know if RTCW will be as ubiquitous a benchmarking tool that Q3 was, because there is such varied environments that you will get vastly different numbers based on what level you are on, its inherent geometry, the size of the levels in general or the number of textures being used.' Regardless of this, you'll be pleased to note that RTCW still has the same benchmarking features included in the Q3A engine.

In the past id hasn't been afraid to make a bold stance in terms of hardware requirements, with the prime example being Q3A's need for a 3D accelerator to run. Id is going to continue this trend with the upcoming Doom engine: 'We made the decision with Doom [3] that if you do not have geometry acceleration on the video card, you just won't be able to play Doom.' So if you haven't upgraded that TNT2 yet, it might be time to start scraping together the cash needed for a GeForce/Radeon-level video card.

The topical issue of cheating, and whether or not id would ever consider legal action against the pathetic, half-witted creators of such cheats, drew a passionate response from Todd: 'It's gonna be impossible to prevent all cheating all the time, but we're going to do our damnedest to try to make online gameplay as cheat-free as possible'. But id would prefer to stamp out cheating via the use of well-thought-out code, rather than an army of lawyers.

Unfortunately for all the dialup users out there, this means id is sticking with its predominantly server-side network code, because 'You can't trust the client . . .'.

Even though id has only 17 employees, it has a level of influence that you'd expect from a company one hundred times its size, especially in the world of Mac. 'It was largely as a result of John's advocacy of OpenGL that Apple adopted it as their hardware rendering API. Steve Jobs said "If we do OpenGL, what will you give me?" John replied, "We'll bring Quake 2 to the Mac, and will guarantee that Q3 will run on it when it's released."' The rest, as they say, is history.

John Carmack isn't afraid to mix it with the creators of the video cards that power most PCs, and is on the technical advisory boards of both NVIDIA and ATI. This lets him get the message about what features game designers desire in video cards, at the same time as making sure they don't have special features that need to be specially coded for. The reason for this? '. . . [having to special case code for specific cards] that delays the process and you end up having a bunch of hackish code, glued onto the outside of Carmack's elegant rendering engine. Kind of like drawing a moustache on the Mona Lisa.'

We ended the interview discussing the new box on the block, Microsoft's Xbox. One of Todd's biggest concerns about Microsoft creating a console is that 'Microsoft is notorious for not getting it right the first time but, through revisions, ultimately creating a great implementation.' This does not sit well with the console concept of releasing a product, getting it right the first time and then leaving it for five years. Maybe that's why Microsoft was so intent on getting a hard drive into its console, as it makes a great place to store a service pack in future.

As for the Xbox stealing all of the PC's thunder, Todd is confident that the PC will '. . . hold the bleeding edge, technologically.' For this reason, the PC will remain the main focus of id's development plans.

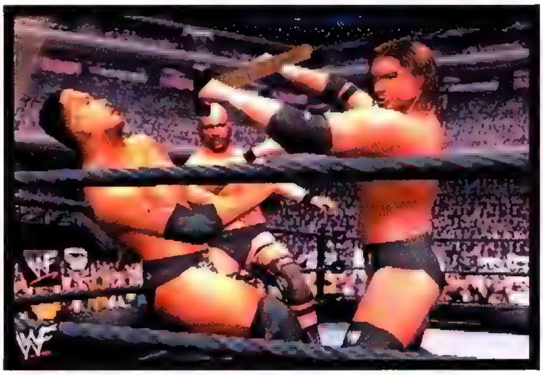
So we can all rest assured that id will continue doing what it does best – releasing the most beautiful 3D action games to be found on our beloved PC.

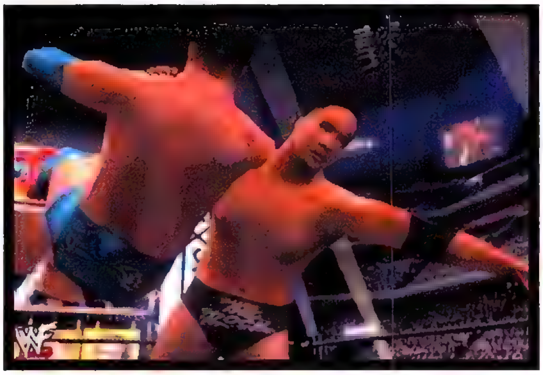
Head over to www.atomicmpc.com.au to check out the full transcript of our interview with Todd Hollenshead. ▢

SmackDown! Just Bring It

It's time to do some punching in the ring with George Soropos.

atomic HOT





Give me a hug, big boy!

SmackDown! Just Bring It is the latest instalment in the best wrestling series of all time. With over two million copies sold in the US alone, it is also one of the more successful game series in recent history, bucking the trend of downward sales that has plagued the industry for the last two years. This is the third in the series, a time when sports games normally start to flounder due to a lack of new features. Thanks to PS2's power and memory capacity that is definitely not a problem.

If you're a fan of the series, the first change you're likely to notice is the new and massive creation system that lets you create your own wrestlers, taunts and 'stables' of wrestlers. The creation menu is quite overwhelming; it allows you to choose everything from the size and sex of your hero to the transparency of their eyebrows. They also get three signature moves and adjustable stat ratings for their skills.

SmackDown also boasts no less than 78 different styles of match, mostly in the 'exhibition' menu where every different style has many variations. However, the best elements of the game aren't simply the numbers, the most this or the highest number of that. As the saying goes, it's all in the detail.

There is now commentary in the game, but the developers didn't leave it there. The commentators are 3D figures sitting beside the ring, and if you want to, you can rough them up a little! A friend or ally can also distract the referee so you can pull off some outrageous attacks with weapons like chairs, tables and Kendo sticks.

SmackDown wouldn't be true to form if it didn't follow the latest developments in wrestling entertainment, so you can now take your fight into the crowd, the car park, backstage, the boiler room, plaza or even the lobby! These locations are best used in Story Mode where you can pick fights and brawls and get into verbal slanging matches over a spit-covered microphone, just like the real thing.

The exhibition modes make up the majority of the game and include all great multiplayer game types such as 6 Man Tag and Caged Ladder, while Story Mode is mainly there to make things more interesting for the single player. In this mode you have to use a created wrestler and one of the WWF stars, and the aim is to take or defend the wrestling world's equivalent of the Academy Awards, the title belts. In this mode you get to indulge in all those thrilling TV-style antics like running backstage for brawls, getting special matches from Vince and trash-talking your opponents.

Yuke's, the Japanese developer of SmackDown, has produced a very good-looking game; everything from the rings to the audiences to the maniacs partaking in the smackdown are rendered to the highest quality.

Something you can't tell from stills, though, is the high quality of the animation, which also has a frighteningly realistic quality about it. The game runs at a uniform 60 frames per second, even with the new maximum of nine wrestlers in the ring at once, making it much smoother than either of its predecessors. One thing that may or may not disturb you about the graphics, however, is the lack of blood anywhere in the game – possibly for censorship reasons. But as we all know, their real-life counterparts are actually cyborg warriors from the future, which actually ooze green hydraulic fluid in the event of a skin rupture.

SmackDown! Just Bring It is just about as close as you can get to the real thing without OD'ing on steroids and removing the left portion of your brain. Apart from Grand Theft Auto 3 and Silent Hill 2, it's the most accomplished game released for the PS2 to date. Even those who aren't fans of the genre would be foolish not to check it out.

atomic

9/10

GAME DETAILS

FOR: Awesome detail, wrestling fans' wet dream.

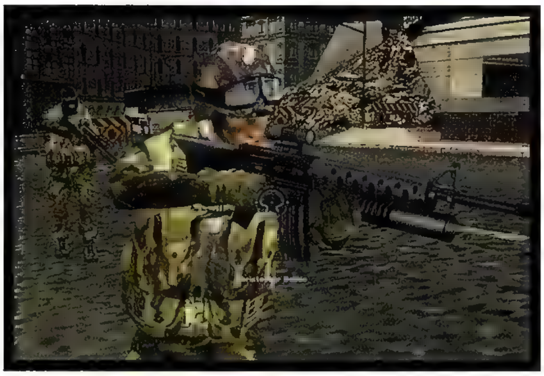
AGAINST: No blood.

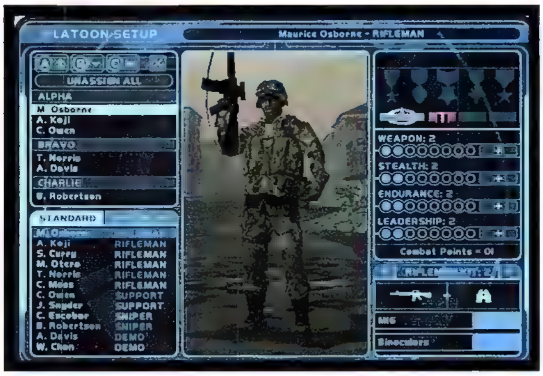
MINIMUM REQUIREMENTS: PS2
RECOMMENDED: PS2

DEVELOPER: Yuke's www.yukes.co.jp
PUBLISHER: THQ www.thq.com.au
DISTRIBUTOR: THQ www.thq.com.au
PHONE: THQ (03) 9573 9200

Tom Clancy's Ghost Recon

Des McNicholas finds war gaming Tom-style more satisfying than the alternatives.





A. Koji	RIFLEMAN
S. Curry	RIFLEMAN
M. Otero	RIFLEMAN
T. Norris	RIFLEMAN
C. Moss	RIFLEMAN
C. Owen	SUPPORT
J. Snyder	SUPPORT
C. Escobar	SNIPER
B. Robertson	SNIPER
A. Davis	DEMO
W. Chen	DEMO

ⓘ LEFT: Environments and individual soldiers are modelled exceptionally well. RIGHT: Choose your weapon!

The original Rainbow Six set new standards for realism, planning and squad interfaces, and Rogue Spear subsequently refined just about everything else. Ghost Recon has moved away from detailed planning and taken the action into expansive field environments that call for quick decisions on the fly. It's an approach that calls for heightened situational awareness, long engagement ranges, and a simple command interface, each of which has been achieved in this excellent game. Ghost Recon provides an unmatched squad-based gaming experience with a very credible campaign, a good mix of single mission options, and absolutely first-class multiplay via LAN, the Internet or Ubi.com.

Set late in this decade, Ghost Recon challenges players to lead a squad of US Special Forces into a peacekeeping mission that has gone badly wrong. Equipment and tactics are broadly based on the US Army's Land Warrior program, incorporating new weapons, an integrated command and communications suite, and a host of high technology gadgets. Players progress through a series of tough multiple objective missions, with the action gradually hotting up as the local political situation deteriorates.

Reconnaissance, pilot recovery, demolition and rescue missions all crop up and short briefings identify primary and secondary targets and highlight potential threats, with quick action plans developed after troops hit the point of entry. Team selection is a simple affair, based around the four key roles of Rifleman, Support Weapon, Sniper and Demolitions. Each has a couple of generic equipment options, and the aim is to spread critical skills across the squad. Although an auto assign feature is available, it makes the odd dodgy selection and most players will want to tweak things themselves. Snipers are good for just about all missions, and the briefings stress the need for any other specialist skills. Squad members improve with combat experience and additional specialists become available if secondary objectives are completed. Ghost Recon's team building process results in strong attachments to individual characters, and encourages rotations so veterans and newbies can rest.

A key toggle provides onscreen access to the map and soldier statistics where routes can be selected, skills and health checked, and orders issued. The system is rudimentary but well suited to implementing the quick decisions called for throughout a mission. Players can take over team members or jump to observer mode at any time. Solid AI is important in a game that relies so heavily on coordinated teams, and Red Storm has done an outstanding job for both sides. Friendly AI is sufficiently advanced to provide covering fire and seize opportunities, and is more than matched by a quick thinking enemy at the higher difficulty levels.

Ghost Recon looks, sounds and feels fantastic and does a great job at mixing the business-like stealth and explosive excitement of Special Forces operations. Horizon and close detail levels easily surpass similar titles, and weather is particularly well handled. Trees sway in the breeze, loose doors swing and bang, and careful observation reveals movement in the distance. The usual sounds of combat are complemented by a host of other real-world noises including dogs barking, birds chirping and raindrops falling, and a decent sound setup adds significantly to situational awareness.

Ghost Recon combines frantic squad-based action, vast real-world environments and a responsive interface. The result is even better than expected! ▢

atomic
9/10

GAME DETAILS

○ **FOR:** Excellent AI, terrific pace, huge environments and outstanding multiplay.

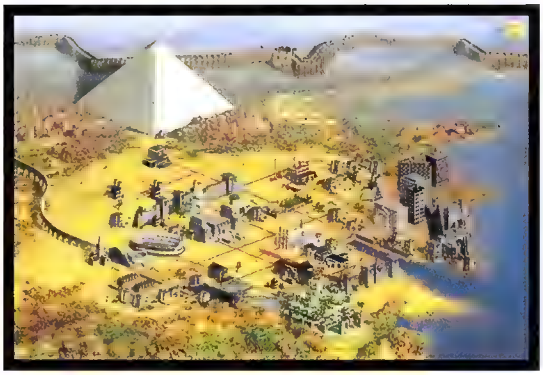
○ **AGAINST:** Saving games is mildly confusing, some minor pathfinding problems.

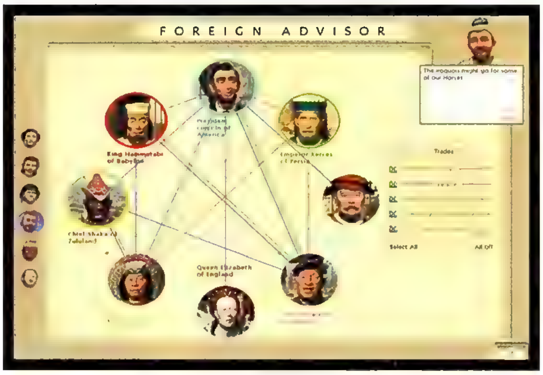
MINIMUM REQUIREMENTS: Pentium II 450MHz, 128MB RAM, 1GB HDD, 16MB DirectX 8.0-compatible video card
RECOMMENDED: Pentium III 500MHz, 256MB RAM, 32MB video card
SOUND APIs: Direct Sound
VIDEO APIs: Direct3D

DEVELOPER: Red Storm Entertainment www.redstorm.com
PUBLISHER: Ubi Soft www.ubisoft.com
DISTRIBUTOR: Ubi Soft www.ubisoft.com
PHONE: Ubi Soft (02) 8303 1805

Sid Meier's Civilization III

Want to kiss your social life goodbye? John Gillooly shows you how.





LEFT: There is a swag of updated features, such as the slick city view for all the city show-offs out there, and RIGHT: an intuitive overview of often complex diplomatic relationships.

I don't think anyone actually knows what Sid Meier does apart from slap his name on the front of games. Heck, I am half convinced that he is purely a marketing gimmick, a branding exercise thought up years ago that kinda stuck. The one guarantee is that a Sid Meier-labelled game won't suck, and this is something that has been drilled into us after many late nights of gaming.

The latest spare time destroyer to bear the moniker is Sid Meier's Civilization III. After a mishmash of sort-of sequels over the past years, the Civilization name has finally returned to its spiritual home, which finally means we can retire our well-used Civilization II discs.

For those who have escaped the Civilization addiction over the past few years, its games are based on the simple premise of recreating the whole of human history in a turn-based strategic environment. Taking up the reigns of your chosen civilisation, it is up to you to build, educate, battle and trade your way to victory. These same basic concepts carry over into Civilization III; however, for those who are familiar with the series, there are some highly significant changes to the formula.

Under the influence

There are six major ways to be victorious in Civilisation III. The first and most bleedingly obvious is by systematically wiping out all the other civilisations. But apart from this there are also diplomatic, cultural and research-based paths to victory, all of which will seem like viable options at one point or another over the course of your civilisation's development.

Cities are your empire's basic building blocks. After they are created by Settler units, cities grow to become the pollution spewing megalopoli that we all know and love. As a departure from previous games, Settler units are now distinct from the standard worker units, taking longer to build and making a bigger hit on your city's population.

Worker units are used to irrigate, mine, build roads, clean pollution and do other grunt work that is required to build up your empire. One thankful addition is the extensive list of automation commands, through which you can tell workers to only do a single task or to focus on wider issues such as building up the road infrastructure needed for trade and resource gathering. For anyone who was plagued by the somewhat dodgy automation in Civilization II, this is a very welcome reprieve.

In this city building phase, there are a lot of important things to take into account. The first (and perhaps one of the most significant changes over previous games) is the notion of culture. Culture determines your national borders and is generated by cities. How culturally influenced a city is depends upon what sort of buildings it contains as well as population size. The cultural boundaries spread out from cities and join together, essentially creating a blanket under which rivals cannot establish new cities.

As your cultural influence expands, rival cities become so impressed that they decide to swap sides and become one of your adoring minions. This makes good management of culture activities absolutely essential for building a successful empire. Often you can make it through the game engulfing cities this way and never firing a shot (okay, it's rare but it could happen).

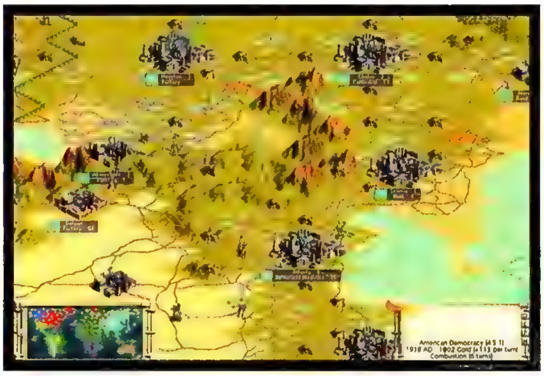
Reinventing the wheel

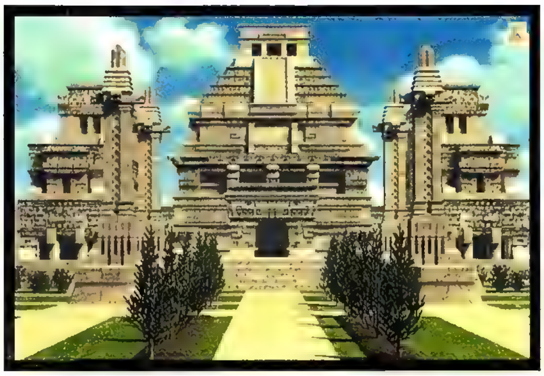
We've all heard that junk about the pen being mightier than the sword, which is fine if the pen is really sharp, but most of us would take a whopping great scimitar over a ballpoint any day. This brings us to two of the other main foundations of the game, learnin' and fightin', also known as research and building your military.

For your civilisation to move from the primitive days of spears and arrows to the sanitised air forces and cruise missiles of the present era, you need to learn things. This is done by funnelling money from pure tax into research funding. You can also build city improvements to enhance research.

The technology tree will be familiar to those who have played previous Civilization games; however, it now includes a much more comprehensive interface, which lets you set a long-term research objective to work towards.

Warfare has always been a part of the games, but it has received an overhaul and now operates on a much more logical system. The majority of your forces are single units, which you can build with certain research advances. The vast majority of these units are ground based, but there are some notable exceptions. For instance, fighters and bombers, once built, no longer travel around the map like normal units. Instead, they have an operational range and can be assigned a variety of orders, like bombing and reconnoitring any square within that range. This is





LEFT: The world map, where you spend most of the time, is beautifully rendered. RIGHT: Gone also is the Throne Room, to be replaced by the Palace for all your ego massage needs.

> **'As your cultural influence expands, rival cities become so impressed they decide to swap sides . . .'**

similar to the way that artillery and ship bombardments work. These attacks must be made from a square within range of the target, rather than the direct attacks made by normal military units.

The scope of military units has improved; each civilisation is given a special unit, which makes it more interesting. For instance, the Americans have an F15 rather than a standard fighter jet, and the Japanese build Samurai instead of horsemen. This has a subtle effect of emphasising the historical changes in a civilisation's power, and it really does make the game that much more realistic.

In a nice departure from the previous titles, in which an experienced spearman could hold off a horde of tanks, battles are much tougher, and if you have a more technologically advanced army, then you have a distinct advantage over older, less advanced units.

Swap ya for it

One of the most pervasive changes that has been made is the complete reworking of resources, trade and diplomacy. No longer is it just a case of researching an advancement and starting to build it. Certain units and buildings require specific resources for you to build them. And you can only be made aware of these resources through research. So, there are often some nasty shocks when you are the first to discover gunpowder; you find that you don't have access to Saltpeter, a necessary resource for building any gun-wielding units.

You can use this to your advantage, maybe by making a grab for the many oil fields to create an OPEC-like price-fixing power block based around the resource. Excess resources, and luxury items like silk and wine, can be traded with other civilisations as long as a few conditions are met. The overarching rule is that, in order to trade with a rival civilisation, you must either have a road or rail link to their capital, share harbours on the same ocean or both have airports.

Diplomacy is also a very important part of the game. Your interactions with other civilisations are much more complex thanks to a newer, more flexible negotiation system. This system allows various combinations of gold, resources, treaties, technologies and even cities to be traded.

They just don't make games like this anymore. Sid Meier's Civilization III manages to achieve the skillful combination of complexity and approachability that most game developers don't even bother going near nowadays. Creating the perfect civilisation tends to become a crusade, with all peripheral things like work, eating and sleeping pushed way into the background.

It is such an immense game that it is easy to visualise it still being played and explored in a year or two, and when lined up against the average calibre of games around, there is no doubt that this is a landmark title. Finally, a worthy heir to the Civilization name is here – clear your social calender and get lost in the masterpiece.

atomic

10/10

GAME DETAILS

○ **FOR:** Everything

○ **AGAINST:** There are only 24 hours in a day.

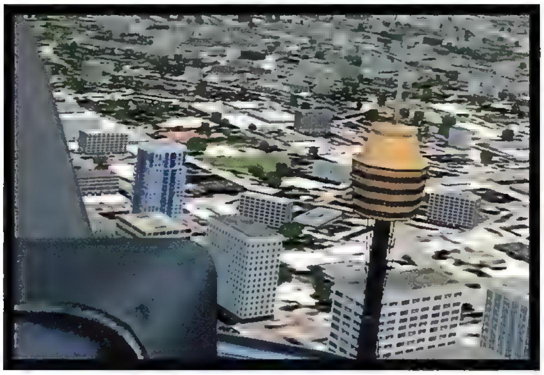
MINIMUM REQUIREMENTS: Pentium II 300MHz, 32MB RAM, 400MB HDD
RECOMMENDED: 500MHz CPU, 64MB RAM, 400MB HDD, no social life
SOUND APIs: DirectDraw
VIDEO APIs: Direct Sound

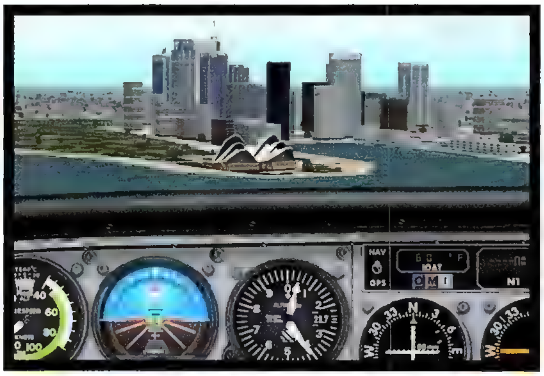
DEVELOPER: Firaxis www.firaxis.com
PUBLISHER: Infogrames www.infogrames.com
DISTRIBUTOR: OziSoft www.ozisoft.com
PHONE: OziSoft (02) 8303 6800

Flight Simulator 2002

Des McNicholas reckons that Microsoft now has it as real as it gets.

atomic HOT





The new AutoGen feature does an excellent job of modelling cityscapes – can anyone guess where this is?

The Microsoft Flight Sim lineage is long and distinguished, with a history of delivering realistic and accessible simulations of the flying experience. Despite generally average ground detail, a less than exciting pace, and the inevitable mismatch between box hype and reality, new versions have always sold well by offering incremental improvements and the support that comes with a major industry player. Fortunately, Microsoft has opted for a significant overhaul of the entire package this time around; as a result, Microsoft Flight Simulator 2002 (FS 2002) is the best in a good series.

FS 2002 successfully balances realistic flight models with the thrill of exploring known landmarks in all kinds of environmental conditions. Pilots can opt for pleasure trips to exotic locations, develop their own flight plans, or try their hand at a variety of system failures on take-off, approach or during long-haul flights. Twelve aircraft (16 in the Pro Edition) are available to fly out from 21,000 airports, including the Sopwith Camel, the Bell 206B JetRanger helicopter, the Cessna Skyhawk 172, and the long-awaited Boeing 747-400. Although the decision to use an electronic manual is disappointing, Microsoft has softened the blow by providing an excellent range of training missions, extensive disc-based documentation and improvements to the traditional interface.

FS 2002 would doubtless be a success on the existing fan base alone, but newcomers are well accounted for with Microsoft's excellent approach to flight training. Players will be up and flying quickly, thanks to a very folksy tutorial by husband and wife team John and Martha King, and a comprehensive series of training flights under the guidance of real-world flight instructor Rod Machado. Virtual cockpits help to maintain situational awareness in some aircraft, and the new Flight Analysis screen provides a useful post-flight summary of how things went. The flight models are very challenging at the higher settings, but learners can choose to ignore minor inconveniences – like crashing and running out of fuel – by tweaking the impressive range of options.

As advertised, Microsoft's new AutoGen rendering technology has taken the game's ground detail to a new level, and manages to do so with a good frame rate on relatively modest systems. The level of detail in AutoGen is built up as areas are approached, culminating in some truly impressive cityscapes and natural scenery. Generic buildings are used to represent city outskirts and sprawling suburbia, but many well-known structures are accurately modelled. It works fairly smoothly and is great for the low-level flying experience during scenic tours of some of the world's most beautiful locations and destinations.

The extra ground detail is more than matched by the traffic generated from the new Air Traffic Control (ATC) and Crowded Skies features. ATC is a feature that has been tried with limited success in the past, and it will no doubt account for many FS 2002 sales to serious desktop pilots. Crowded Skies complements ATC by generating realistic numbers of aircraft around major airports, as well as the odd surprise in remote locations. The competition can be realistically annoying, with players required to wait patiently for clearance while the Tower sorts the backlog.

Flight Simulator 2002 is an outstanding simulation that looks better, flies better and trains better than anything else. Experts may want to opt for the Pro Edition, which includes cooperative flight instruction and a flight dynamics editor, but the Standard Edition is great value in its own right. ▢

atomic
9/10

GAME DETAILS

FOR: Huge improvement on earlier versions, excellent training package, a terrific range of aircraft.

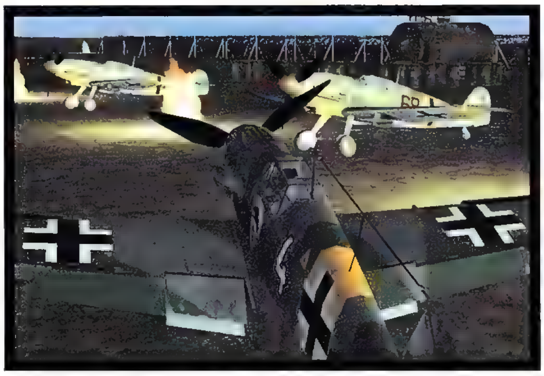
AGAINST: No paper manual, not enough external views, and some minor menu glitches.

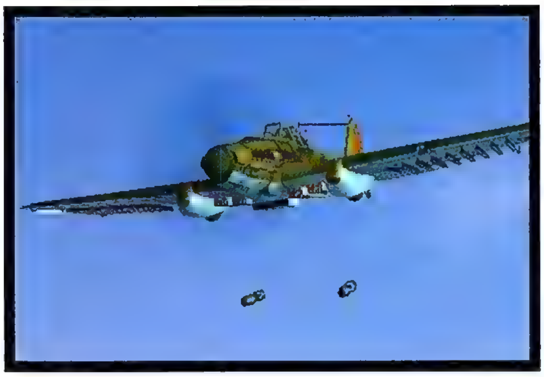
MINIMUM REQUIREMENTS: Pentium II 300MHz, 64MB RAM, 650MB HDD, 8MB DirectX-compatible video card
RECOMMENDED: Pentium III 500MHz, 128MB RAM
SOUND APIs: Direct Sound
VIDEO APIs: Direct3D

DEVELOPER: Microsoft www.microsoft.com
PUBLISHER: Microsoft www.microsoft.com
DISTRIBUTOR: Microsoft www.microsoft.com
PHONE: Microsoft (02) 9870 2200

IL-2 Sturmovik

Your pilot for this review will be Des McNicholas.





These shots just don't do the amazing visuals any justice.

IL-2 Sturmovik has been a long time coming. Although spared the frenzied hype that surrounds most potentially ground-breaking titles, serious sim fans have patiently waded through the reams (and years) of positive previews that flagged it as something very special indeed. In it's first major international release, successful Russian developer 1C: Maddox Games has exceeded all expectations and delivered a game that combines the best traditional flight sim elements with a host of innovations. Sturmovik improves on almost every aspect of the genre, sporting superior flight models, better graphics, more challenging missions and an exciting atmosphere.

Maddox has recreated the era in meticulous detail, with over 30 flyable aircraft, six campaigns, massive 3D environments and a series of remarkably challenging missions. Forty non-flyable aircraft types also fill the screen, while almost 80 identifiable vehicle and ship models prove to be tempting targets. Extensive mission builders are included in the package, and multiplay for up to 32 players (16 if co-operative) is also supported via LAN, Internet, or dedicated servers.

Sturmovik's pre-mission briefings are detailed text affairs that would benefit from some animation, and players will generally rely on the in-flight map to stay on track. Missions include fighter sweeps, the interception of bombers or transport aircraft, patrols, close air support, and attacks against armoured formations, structures and ships. Weapon load-outs and some mission parameters are configurable via a decidedly average menu interface, and mission objectives can be confirmed in flight. Unexpected encounters add spice during some missions, and things are also made tougher by the stunning weather and lighting effects. It's fair to say that no other game comes close to matching Sturmovik in the realism of the game environment.

Each of the Russian, German and US aircraft have unique flight characteristics that offer very different experiences – particularly once they start to sustain damage. While this is a game that will satisfy the experts, Sturmovik's difficulty levels are wholly configurable, and newcomers will conquer the basics very quickly. All control surfaces are expertly modelled and operate accurately, and the general level of exterior mechanical detail is far better than usually seen on a combat flight simulation.

Maddox has managed to combine such high levels of realism with terrific artwork and a strong sense of atmosphere. The aircraft look great in themselves, but the little touches make all the difference over Sturmovik's very long flights. The cockpits look grimy and war weary, with the mud- and oil-splattered canopies seriously affecting visibility at times, and the exterior camera views highlight subtle differences between individual squadron aircraft. Damage modelling is absolutely first-class, both visually and in the way it affects handling, with flying stresses slowly worsening serious battle damage until important bits start to peel away! A good sound mix rounds out the atmosphere, highlighted by some great changes in engine pitch and incessant chatter over the radio.

IL-2 Sturmovik has more than delivered on the promises made by Maddox over the last few years, offering excellent flight models, a great atmosphere and an emphasis on ground attack rather than straightforward dogfighting. A must-have for veterans and the best possible introduction for newcomers.

atomic
9.5/10

GAME DETAILS

FOR: Incredible detail, great flight models, topnotch AI and huge potential for expansion.

AGAINST: Interface is very average, slow load times, needs a high-end system to see it at its best.

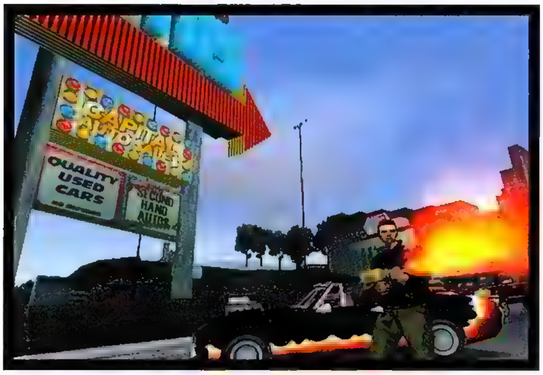
MINIMUM REQUIREMENTS: Pentium II 400MHz, 128MB RAM, 500MB HDD, 16MB DirectX-compatible video card
RECOMMENDED: 800MHz-1GHz, 256MB RAM, 32MB video card
SOUND APIs: Direct Sound, EAX
VIDEO APIs: Direct3D, OpenGL

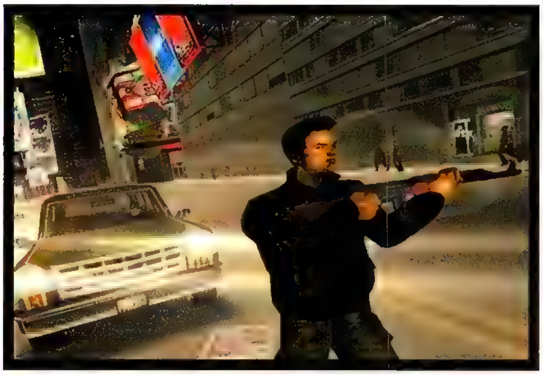
DEVELOPER: 1C: Maddox Games www.il2sturmovik.com
PUBLISHER: Ubi Soft www.ubisoft.com
DISTRIBUTOR: Ubi Soft www.ubisoft.com
PHONE: Ubi Soft (02) 8303 1805

Grand Theft Auto 3

Notorious joyrider George Soropos becomes a bad-arse gangsta.

atomic HOT





The solution to all your woes usually involves heavy weaponry.

Liberty City is a wonderful place, a veritable gangland United Nations. Imagine the worst of prohibition Chicago, lawless Columbia and Triad Hong Kong distilled into one seedy, bustling metropolis. Add a liberal dose of double dealing, assassination, cop killing and the occasional rampage with an M-16 and you start to get the picture.

The previous two games in this series came and went with nary a murmur and so it is quite surprising that Grand Theft Auto (GTA) has turned out to be the best game yet for PS2.

The closest comparison would be Driver 2, but placed in a vastly more engaging and detailed world with even more style and character, and much more depth. Oh yes, and the pedestrians don't run out of the way; they get squashed flatter than a pancake with a liberal coating of red jam. You can even jump out of your car and beat them to death. Now that's progress!

You play as a man in the wrong place at the wrong time wearing the wrong-coloured pants, but freed through chance onto the mean streets of Liberty City. And when we say mean, we mean drug-dealing, bank-robbing, kidnapping mean.

Getting around is easy; just stand in front of the next car that comes along and hijack it. If you're feeling adventurous you can even steal a Firetruck and earn cash by putting out fires; take an Ambulance and work for the Hospital; grab a Police car and go on a vigilante mission; or even play Crazy Taxi by grabbing a Cab.

Scattered around the gameworld, usually in hidden places, are pick-ups that trigger Rampage missions to kill as many gang members in that area as possible, and some of the phone booths around the city will put you in contact with various hoods whose roles generally involve racing of one sort or another. There are also special vehicles parked around the city that look normal enough but when you grab them a mission is triggered; for example, you may be given a series of waypoints to pass in a certain time. There is no shortage of things to do in Liberty City, and we haven't even mentioned the main focus of the game yet.

The city is divided into three sections and each is controlled by two or more different crime figures that you will eventually meet and work for. These characters give you the main missions in the game and move the story along. You can visit the employers you know anytime, and if you fail a mission you can just return and it will be offered to you again.

You cannot die permanently in GTA3: if you get wasted you will appear at the nearest Hospital; if you are arrested you will appear outside the local Police station, with a slightly longer criminal record. It may not seem realistic but this structure allows the flow of the game to continue without having to worry about backtracking all the time if you fail.

On a technical level GTA3 is quite an achievement, especially given the fact that the previous versions were 2D top-down scrolling shoot-em-ups. Liberty City is superb in every detail, and a phenomenal amount of work has been put in to make it so. Even after a week of almost non-stop playing, new things still regularly pop up. This is even more impressive when you remember it's running on PS2, not some 3GHz, GeForce 17-powered behemoth of a PC. Surprisingly for a console, there is a slight amount of slowdown when there is a lot happening onscreen, but for the most part the intricate 3D environments fly by at a smooth pace.

Just as impressive as the game's visuals is the audio. There are ten very different radio stations in Liberty and most of them have a swag of original tunes for your listening pleasure, including a talkback station – and the ads are priceless.

If you are holding out for an Xbox or Gamecube, this could be the game to change your mind. ▢

atomic
9.5/10

GAME DETAILS

FOR: Engaging, addictive, relentless fun.

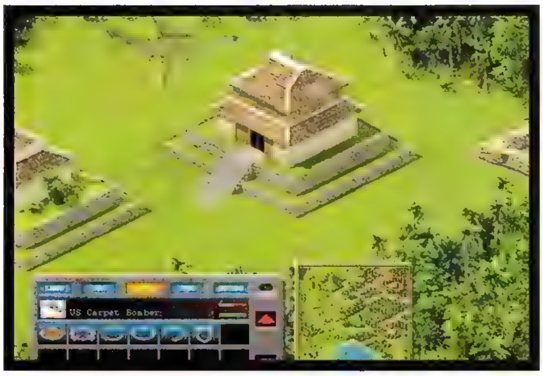
AGAINST: Bit of a no-no for younger gamers.

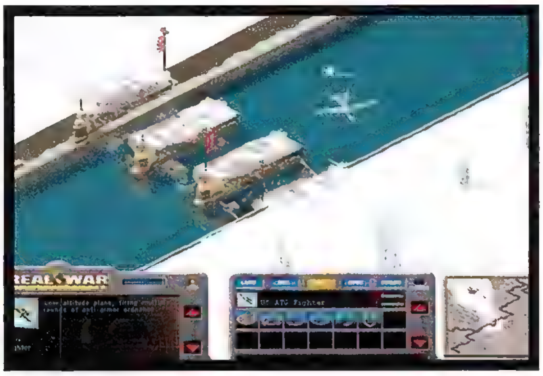
MINIMUM REQUIREMENTS: PS2
RECOMMENDED: PS2

DEVELOPER: DMA www.dma.co.uk
PUBLISHER: Rockstar Games www.rockstargames.com
DISTRIBUTOR: Take 2 Interactive www.take2games.co.uk
PHONE: Take 2 Interactive (02) 9482 3455

Real War

Enough fantasising. Des McNicholas tries his hand at some real RTS.





A US bomber pays a courtesy call on an ILA Rapier post.

Billed as the commercial version of a US Joint Chiefs of Staff training game, Rival Interactive's debut title Real War raises high expectations on the box. Real War promises '. . . real-time strategy with the weapons of today's military'. Sadly, the result is a pedestrian title that misses the mark in both the reality and gaming stakes. It has a few interesting features, but Real War offers little to compete with recent games that have handled the genre much more effectively.

Real War is about a US global war against terrorism, a remarkably prescient story-line. Responding to the use of chemical weapons in the Baltic States and attacks against American shipping, Congress has authorised US military force against the Independent Liberation Army (ILA), also equipped with a formidable array of weapons and material. The ILA terrorists see themselves as freedom fighters waging a war against imperialism. Real War has two campaigns (one for each side), a basic tutorial, a skirmish mode and multiplay via Internet, LAN or GameSpy. The manual omits some important information, but anyone with RTS experience will be up and running quite quickly.

Despite its pretensions of a higher level of realism, Real War is essentially a standard RTS in which the aim is to accrue resources to build the necessary structures and units. Supplies are acquired by building or capturing Supply Depots, which are then automatically replenished by the AI. Once land, sea and air command centres are built, specialist buildings and units can be purchased, and special weapons developed. It's an approach that works well enough, although the mix of buildings is relatively small and there's really not much difference between the adversary's equipment capabilities. The game's key innovation is that Rival Interactive has engineered a good balance between land, sea and air systems, with the fighting spread across the three domains. Land units include infantry, rocket infantry, guerrillas and special forces, supported by armour, artillery and recon. Air assets include air-to-ground fighters, helicopters, bombers and drones, supplemented by electronic jammers, propaganda planes and anti-submarine aircraft. Highlighting the remarkable inventory of the ILA terrorists, both sides have gunboats, submarines and aircraft carriers, and can conduct amphibious operations and lay mines. The units are all generic in nature, with no attempt made to differentiate between variants of the standard platform types.

Real War has a straightforward interface that enables detailed control over all units. The traditional RTS mini map and build menus are presented onscreen. While control could be simplified with a less hierarchical menu structure, it works well and can be mastered quickly. Units can be grouped and assigned formations by shortcut keys and screen buttons, although the unusually dull AI does a very poor job of following orders. Fortunately, the enemy AI is no better – hardly a bonus in an RTS! All buildings and units look okay, if a little small, at high resolution, and the initially cumbersome camera system does an excellent job of tracking units and honing in on the action.

Real War is a below par but competent RTS that fails to live up to the promises made on the box. Rival Interactive has taken a reasonable stab at bringing the joint aspects of land, sea and air power to the RTS genre, but the game is let down by numerous minor faults that will disappoint those looking for the over-hyped realism of Real War.

atomic
6.5/10

GAME DETAILS

FOR: Good mix of land, air and sea assets. Shallow learning curve, and no looking for resources.

AGAINST: Lousy AI, cumbersome menu structure, and the forces are too balanced.

MINIMUM REQUIREMENTS: Pentium II 333MHz, 64MB RAM, 150MB HDD, 8MB DirectX-compatible video card
RECOMMENDED: Pentium III 500MHz, 128MB RAM, 600MB HDD, 16MB video card
SOUND APIs: Direct Sound
VIDEO APIs: Direct3D

DEVELOPER: Rival Interactive www.rivalinteractive.com
PUBLISHER: Quality Value Software www.qvs.com.au
DISTRIBUTOR: Quality Value Software www.qvs.com.au
PHONE: Quality Value Software (02) 9748 2555

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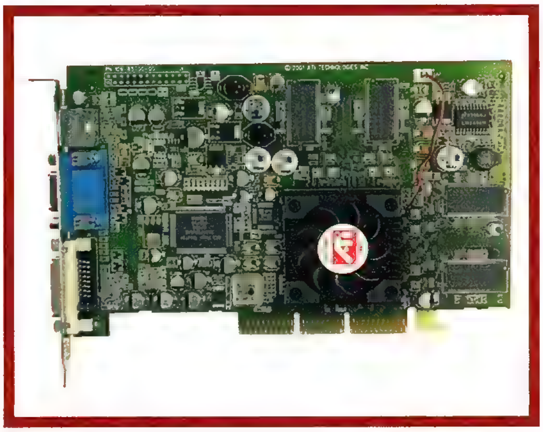

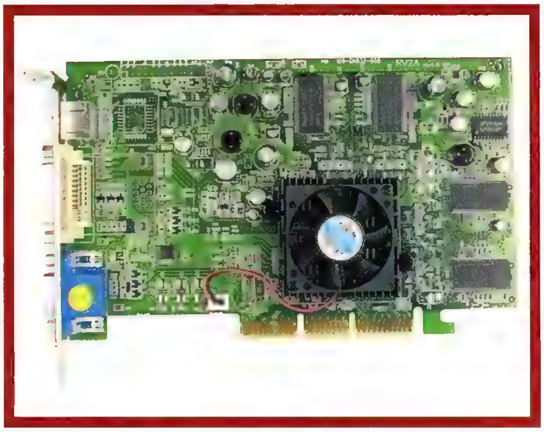

It had to happen. NVIDIA's reign over the bits that make the pretty pictures on your PC has at last been severely threatened by a product from the silicon surgeons at ATI. The all-singing, all-dancing Radeon 8500 showed that it has what it takes to bring the GeForce3 down in last month's Atomic, and its smaller sibling, the 7500, did darn well in this month's round-up (see page 57). So it is with great pleasure, and more than a little envy, that we are giving them away to a couple of lucky subscribers.

Even if you don't win a Radeon, you'll still be a winner if you subscribe to Atomic.
At $49 for 12 issues you'll save a GARGANTUAN 45% off the price of Atomic at the newsagents.
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Subscribing is, like, totally logical dude! Where's my car?

Credit where credit is due

Of course, we couldn't hold a competition like this without the amazing generosity of a company to donate the lurvely kit. This month we bow to the saint-like peeps at Australia IT for offering up the two Radeons for use in our monthly Subscription Sacrifice Ritual. Because they've given Atomic a nice dose of free gear lovin', head on over to www.australiait.com.au or give them a buzz on (03) 9882 1811 to give some of that lovin' back. Did you know it's been scientifically verified that companies who donate to Atomic are the best people to buy gear from? You do now . . .

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Atomic12

Alien vs. Predator 2

I love you, I want to eat your brains, hisses Bennett Ring.

LEFT: Alice – an exoskeleton on steroids. RIGHT: Everybody's favourite – our friend the Predator.

The Alien: a ferocious killing machine with razor-sharp talons, acidic blood and a whip for a tail. The Predator: a high-tech bipedal tank, invisible to humans and devastating to all. The archenemy of the Alien, the Space Marine: likes to shout 'Get away from her, YOU BITCH!'. With these three well 'ard warriors, Alien vs. Predator 2 is one of the most refreshing and well-rounded FPSes to hit the PC.

The original Alien vs. Predator received a tepid response, due mostly to its lack of a coherent story-line and poor multiplayer support. The sequel aimed to resolve these complaints, and it looks like developer Monolith has been successful in doing so.

Each species has a single-player story that intricately intertwines with those of the other characters, yet each is vastly different in play style. The Marine campaign is the most atmospheric, with bucket-loads of the 'run backwards in fear while spamming the pursuing pack of Aliens with showers of hot lead' combat style that the movies have made so famous. As the Predator, your focus is maintaining a stealthy approach, picking off your victims at leisure from the safety of your cloaking shield. Brutal is the only word suitable for the Alien campaign; the Birth level, where you begin embedded in an unlucky Marine's chest and must chew through his heart, lungs and rib cage, is a good indication of why. Each story-line is fairly linear and will take the average gamer around six hours to complete, giving the game a total length of 20 hours or so.

Using a revamped version of the LithTech engine known as Talon, the game isn't limited to the clichéd dark and moody corridors that the first suffered from. Many of the levels take place in huge outdoor environments that are perfect for a spot of sniping as the Predator or Marine. This LithTech engine doesn't suck nearly as hard as the one used in NOLF, with smoother frame rates and a higher level of graphical detail. One area that could do with a little more polish is the character animation, which is most evident in the prolific cut scenes driving the story-line and during multiplayer matches.

To test the multiplayer mode, we used the new Atomic Test Server hosted at the Telstra Wireplay server farm in Melbourne (see page 44 for its configuration), with a combination of ADSL, cable and 56K dialup clients. Except for an occasional spurt of lag, the client-side prediction Netcode worked exceptionally well and even the dialup user reported a smooth game. Due to the client-side nature of the Netcode, dialup users will be playing on an even footing with broadband users. The unique style of gameplay gives multiplayer mode a freshness that many FPS gamers will appreciate after the glut of sci-fi and CS clones released over the last few years. Watching a group of Marines spam like crazy in the general direction of a motion sensor contact is a sight to behold, especially when a cloaked Predator finishes said spam session with a decapitating headshot. Several different game modes unlike anything seen before will greatly boost the multiplayer popularity of the game.

AvP2 isn't totally perfect. The player classes are a little unbalanced, but this can be overcome with some creative team organisation. Occasionally the AI controlling the bugs is a bit iffy, getting stuck on bits of the environments. Finally, the linearity of the levels can prove to be frustrating if you've overlooked a locked door or hidden switch. But don't let this deter you; with three great single-player games revolving around the biggest bad arses ever seen on the Silver Screen combined with an innovative and enjoyable multiplayer mode, AvP2 is one of the must-have games of the festive season.

atomic **9**/10

GAME DETAILS

FOR: Aliens, Predators and Marines.

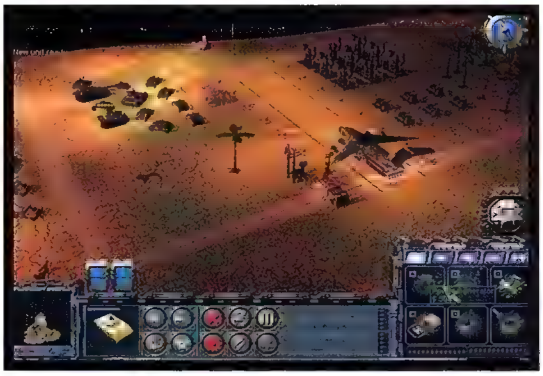
AGAINST: Quite linear, not the smartest AI.

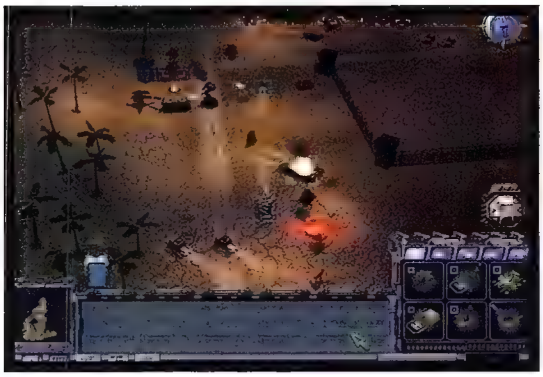
MINIMUM REQUIREMENTS: 450MHz CPU, 128MB RAM, 16MB DirectX 8.0-compatible video card
RECOMMENDED: 1GHz CPU, 256MB RAM, GeForce2 GTS
SOUND APIs: Direct Sound
VIDEO APIs: Direct3D

DEVELOPER: Monolith Productions www.lith.com
PUBLISHER: Fox Interactive www.foxinteractive.com
DISTRIBUTOR: Sierra www.sierra.com
PHONE: Vivendi (02) 9904 4533

World War III: Black Gold

George Soropos tries to capture his local petrol station.





A Starlifter cops a pallet-load up the rear cargo bay.

World War III: Black Gold takes us into the future at a time when the world's oil reserves are estimated to last only another 15 years. The UN has ordered that all the world's oil supplies be seized, but who should stand in the way of that order? Our old mate Saddam. Unfortunately for JoWood, the game has come just a bit too late to include Osama in the equation. To think what that would have done for JoWood's sales figures in the US! Oh well, the presence of America's second most obvious foreign policy failure in recent times should create a little extra interest.

Veterans of TopWare's Earth 2150 and Moon Project titles will be pleased to know that WWIII has been made by the same team that put together those excellent games. It uses the same, slightly modified, engine and has many of the same features that made those earlier games so good.

The contemporary setting of the game means your units are all recreations of actual military hardware – Abrams Tanks, Apaches, Shilkas, Scuds and all that good stuff. Of course, there are some special units as well: APCs that can capture buildings; engineers who can build bridges, flatten ground or build trenches; and supply choppers that fly ammunition directly to your guys on the battlefield.

There are three sides in this conflict: the US, Russia and Iraq, with the first US campaign required to unlock the others. The three sides are nicely balanced for multiplay, with the Yanks having the trickiest hardware, the Russians the hardiest and the Iraqis the looniest. Saddam has units like suicide bombers to reflect the religious fanaticism of his followers, as well as nasty chemical weapons.

One of the best features of previous titles (from the same mob, of course) was the AI that controlled your units' behaviour, and the subsequent level of automation that this allowed for. That control is there again, and you can set layers of automation to make your units do things like retreat when they have a specific amount of damage, or call for rearming or repairing.

Your resources in WWIII come from, you guessed it, oil. Because the stuff is supposed to be so scarce now, on most maps you will have to place a strong emphasis on efficiency. Building masses of units and lazily charging them at the enemy willy-nilly will soon leave you helpless.

FOW and Line of Sight rules are in full effect in WWIII, so spotting enemies for your long-range units is essential, while charging blindly into an enemy position is ill-advised. The game also has a day/night cycle that affects the viewing range of your various units.

One of the more interesting aspects of WWIII is its voice recognition support and subsequent ability to allow espionage as a part of that. Using this feature online will most likely slow the game down to a crawl, but on a network teams can spy on each other's communications using special technology – even steal camera feeds! As in its earlier games, WWIII also boasts underground tunnel systems that are important strategic elements when they are present. It also has a tech tree system that allows the player to develop technology along any path they choose and then use that technology to customise their units.

The 3D engine driving WWIII still looks and plays better than its competition after two or more years, which is testament to the class and skill of programmers at Reality Pump. If you're looking for a solid engine and a game that allows you some scope for creativity and tactical flare, look no further.

atomic

8/10

GAME DETAILS

FOR: Best RTS with a contemporary theme on the market. Spy on enemy transmissions in multiplayer!

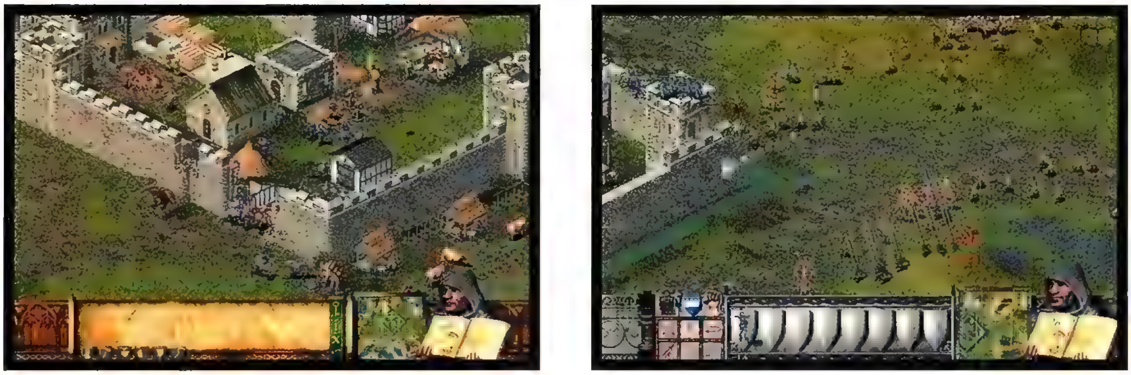
AGAINST: No permanent base as in earlier titles.

MINIMUM REQUIREMENTS: Pentium II 350MHz, 32MB RAM, 200MB HDD, 8MB video card, DX Sound
RECOMMENDED: Pentium III 600MHz, 64MB RAM, 800MB HDD, 16MB video card
SOUND APIs: DirectX, Microsoft Speech Recognition
VIDEO APIs: Direct3D, OpenGL, Glide

DEVELOPER: Reality Pump worldwar3.jowood.de
PUBLISHER: JoWood www.jowood.com
DISTRIBUTOR: Red Ant
PHONE: Red Ant (02) 9882 1222

Stronghold

Portcullis connoisseur George Soropos develops a siege mentality.



Castles hidden by high walls – are you ready for medieval siege warfare?

It's that time of year when all the gaming big guns emerge from their hiding places, and Stronghold has turned out to be one of the biggest – a veritable Saddam Hussein super-railgun of gaming goodness. Stronghold takes the RTS genre into new territory by focusing entirely on the art of medieval siege warfare; on constructing, defending and occasionally attacking whopping great castles.

The basic structure of the game will be instantly familiar to any veteran RTS fan. You begin with a central structure that allows you to attract more villagers to your cause, a Keep. The availability of workers depends on what the conditions for them are like regarding taxes and rations; good conditions will lead to faster growth. The villagers are your worker units and also provide recruitment fodder for your army. To keep your settlement growing, careful management of the available resources is vital.

Stronghold is not just a combat game. There is a wide variety of resource types; some such as bread and cheese are needed to keep the workers happy, while other resources like stone and iron are needed for weapons and castle walls. In fact, the economic system in Stronghold is so well developed that you can actually choose to play an economic campaign or scenario from the main menu as well as the combat equivalents.

However, the real fun in Stronghold comes when building and defending your castles from attackers, which the game lets you do in many interesting ways. There are 11 different military unit types, as well as six different offensive siege weapons, two defensive siege weapons and 74 different structures. Moats can be built, boiling oil poured, and wall-collapsing tunnels dug out. Ladder troops will try and get enemy troops up over your walls while your spearmen try to push them off – it's all rather spectacular to watch!

The terrain maps are in true 3D, and elevation and cover have an advantage over firing range and defensive strength. For example, a tower filled with archers on a tall hill will be able to hold its own against a vastly superior force, unless this force has siege engines.

The environment also plays a part in resource management, as food resource types can be affected by disease and infestation. Sending out the troops to stop a bunny plague, for instance, can make for a very interesting diversion.

Managing your resources can be a tricky business at times, as you rarely have the luxury of a completely enclosed township. Some vital farmland or quarry is bound to be outside your castle walls, so your forces have to be flexible. Knights, for example, must be able to sally forth from the castle and counterattack your enemies to protect these outlying areas.

Stronghold comes with a good map editor to make your own missions, but there's no campaign editor, which is a shame. The multiplayer aspect of Stronghold is good and, because of the nature of the game, lots of fun.

There aren't any different game types, just a menu that allows the modification of certain features like starting resources and the like. Just remember, it's a lot easier to defend than to attack – as long as you know how to build a good castle.

If you don't, or you do it too slowly, there is the potential to be 'tank rushed' and overrun, which is probably the only weakness in the game – well, that and a single-player campaign that's just a bit on the too short side.

atomic

9.5/10

GAME DETAILS

FOR: Unique and refreshing example of the real-time strategy genre.

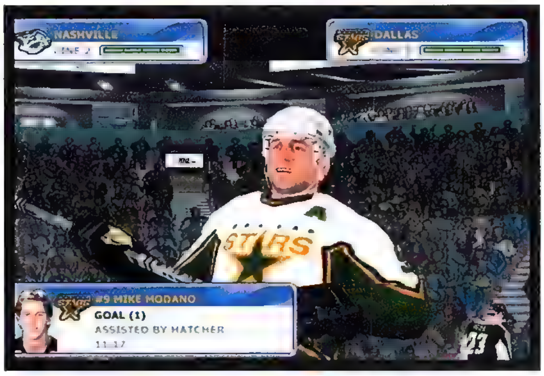
AGAINST: Single-player campaign too short.

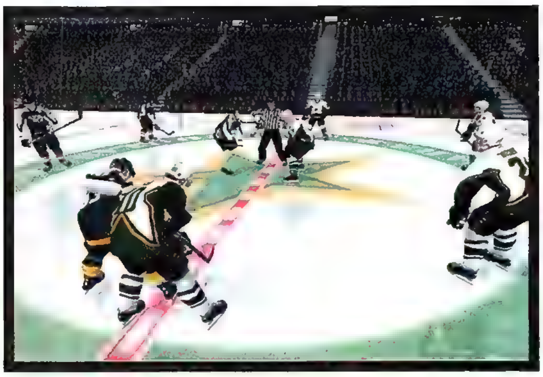
MINIMUM REQUIREMENTS: Pentium II 300MHz, 64MB RAM, 750MB HDD, 4MB video
RECOMMENDED: Pentium III 800MHz, 128MB RAM, 16MB video
SOUND APIs: DirectX 7.0
VIDEO APIs: DirectX

DEVELOPER: Firefly www.fireflyworlds.com
PUBLISHER: Take 2 Interactive www.take2games.com
DISTRIBUTOR: Take 2 Interactive www.take2games.com
PHONE: Take 2 Interactive (02) 9482 3455

NHL 2002

Des McNicholas checks out EA's latest sports game.





The new range of camera views brings the action right into your living room, highlighting just how ugly some of these guys are.

NHL 2002 has a strong pedigree, built on the solid foundation laid by the 2001 version. Despite having the team sports niche pretty well sown up, EA continues to surprise fans by adding new dimensions to its proven formula, with NHL 2002 bringing much more than a few cosmetic changes to last year's hit. Ice warriors everywhere will be pleased with the improved graphics, smarter AI and introduction of trading cards – all shown off with new camera angles and some upbeat commentary. A terrific range of configuration options ensures that NHL can be tailored to almost anyone's taste, striking an excellent balance between fast-paced fantasy sport and the realism demanded by armchair athletes. All US NHL teams are represented to contest the Stanley Cup over the whole season; or players can choose to concentrate on the play-offs, set up a customised tournament, or shoot it out in a penalty shot war in Shootout mode. An easily configured Quick Play game is also available, and multiplay is supported via Internet, LAN, modem or EA's Matchmaker Service. Team selection is straightforward, and NHL's Fantasy Draft feature ensures that anyone with a head for player statistics will not be stuck with the draft choices made by the pros.

Not surprisingly, NHL's controls are very simple. Various combinations of half-a-dozen keys cover the essential ice hockey skills of passing, shooting, blocking and dekes, all of which become second nature within the first five minutes of play. Although the manual is a little light on detail, the beginner-level season kicks off with a short commentated tutorial, and the difficulty settings offer a very shallow learning curve for those not familiar with the series. This is a very easy game to get into; it allows players to appreciate the depth that underpins such an unobtrusive interface and the little touches that stand EA titles out from the crowd. NHL's on-ice action flies along at a blistering pace, incorporating all the sights and sounds that make the real thing such a great spectator sport. The character creation screen can be used to build custom players from the ground up; although importing a self-portrait is still more trouble than it's worth. EA's team options are also a coach's dream, with pre-planned strategies available for offensive and defensive plays, and diagrams on hand for quick reference. If all else fails, players who under perform can always be traded during the season, or offloaded at the next draft!

EA has put a lot of effort into capturing the feel of televised sports with NHL. The camera angles match those on TV, and the new breakaway camera jumps in close to record brilliant plays as they happen. New views are also available for great saves and big hits, while the innovative Game Story feature recaps highlights during short breaks in play. Play can lag a little with so many features, but they're all part of the experience and impatient players can always cut past them or configure them out pre-game. The introduction of trading cards ensures plenty of action for the cameras to record, with points earned for completing specified tasks used to access some interesting power ups and celebrations.

NHL 2002 is an excellent game that offers great sights and sounds, an exciting atmosphere and some fast action. EA has managed to improve on NHL 2001 in all key areas, while retaining the mix of realism and simplicity that made it such a success. A great game for newcomers, and worth the extra investment by owners of the original.

atomic
8.5/10

GAME DETAILS

FOR: Fast, furious and fun; looks and sounds great; a very shallow learning curve.

AGAINST: The manual is average, the self-portrait feature still needs some work, tired commentary.

MINIMUM REQUIREMENTS: Pentium II 300MHz, 32MB RAM, 150MB HDD, 16MB DirectX-compatible video card
RECOMMENDED: Pentium III 450MHz, 64MB RAM, 350MB HDD, 32MB video card
SOUND APIs: Direct Sound
VIDEO APIs: Direct3D

DEVELOPER: EA Sports www.easports.ea.com
PUBLISHER: Electronic Arts www.ea.com
DISTRIBUTOR: Electronic Arts www.ea.com
PHONE: Electronic Arts (02) 9264 8999

You breakum, we fixum

Love them or loathe them, there is one certainty with PCs. Things can and do go wrong, often at the most inopportune moments. Each incident is usually followed by a bout of kicking, screaming and very occasionally, crying. Cry no more you pour souls, as Atomic's man with the spanner, Dan Rutter, is here to save your day.

Letter of the month: Suspiciously easy

i I recently bought a 1.4GHz Athlon and an ASUS A7M266 motherboard. After a few case mods, the CPU temp sensor was reading 31°C on load and I decided to go to a few sites and learn how to overclock. On my first attempt, I went to the BIOS and raised the FSB speed. To my surprise the computer actually displayed a higher clock speed when it booted up.

I fiddled with the FSB, and each time I booted I got a higher number. I'm not sure if I've really overclocked my first machine, because it just seems too easy to be true.

In the forums I read that you had to unlock the CPU by joining the bridges using a pencil before it can be overclocked, and that you had to fiddle with the jumpers on the motherboard as well. But all I did was play with the BIOS, and got a higher clock speed.

Did I really, or does the clock speed reading at the boot screen mean absolutely nothing? Also, does a 1.4GHz Thunderbird need to be unlocked before overclocking?

Martin Tan

o FSB overclocking is that easy, at least on a motherboard that supports software FSB adjustment, and most do these days.

Unlocking an Athlon or Duron lets you change the multiplier – the ratio between the core speed and the FSB. Your 1.4GHz CPU, for instance, has a 10.5x multiplier and a 133MHz FSB, as its default settings.

Multiplier adjustment is a better way to overclock than by just winding up the FSB, because changing the multiplier doesn't increase the speed at which anything else in the computer has to run. Some modern motherboards let you increase the CPU FSB speed without tweaking up the PCI and RAM speeds as well, but not all of them do.

You only have to play with actual physical jumpers on the motherboard if your mobo requires that, for one of the three basic overclocking adjustments: FSB, multiplier and CPU voltage. Or, if you overclock to the point where you can't get into the BIOS setup, you therefore have to use the Clear CMOS jumper to reset your BIOS settings to defaults.

Note that just because a motherboard doesn't have a given feature in the BIOS setup – multiplier adjustment, for instance – that doesn't mean it will have jumpers to do that job. Many motherboards lack one or more of the three overclocking tweaks.

If you want to get the highest possible overclock that your system is capable of, you'll have to go to a little more trouble than just changing the FSB, CPU vcore and/or multiplier. As the saying goes, the more you put in, the more you get out.

And in this case, the thing you'll need to put in is additional cooling. Overclocking tends to lead to higher CPU temperatures, due to a higher clock speed or higher voltage level.

The easiest way to keep a system cool is to make sure your case is well ventilated and install a beefier 'performance' CPU heatsink. Due to the popularity of overclocking, these high performance heatsinks are now a dime a dozen. The next step is to use water or Peltier cooling.

i Can ASIO read your pr0n?

I recently heard on the radio that every couple of years the military destroy their hard disks, rather than simply delete the information stored on them. Apparently the information is retrievable even after it has been deleted because 'there are several different levels of deletion'.

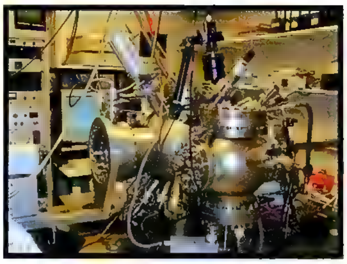
Does this apply to regular hard drives? If so, does that mean that files I deleted years ago are still on there and retrievable? If so, is it possible to have a blank hard disk full of nothing but old, ex-deleted files?

Alex Wong

o Yup, various military organisations physically destroy storage devices they don't want to use anymore. They do this by melting, sawing, shredding, acid baths and other entertaining means – possibly even by telling a class of kindergarten kids that there's something interesting inside the drive. And yes, that's because it is otherwise possible to recover data, even after it's been overwritten.

This is not like undeleting – recovering data that hasn't been overwritten yet. You can do that with a simple piece of software. Overwritten data can't be read normally by a drive, but the drive's own read heads can be used to recover data that's only been overwritten one or two times. To do that, you have to hook up specialised sensor gear to the heads, instead of using the standard read electronics.

For anything better than that, the platters have to be read by more sensitive, and fabulously expensive, equipment. Like a



A scanning tunnelling microscope can read overwritten data on a hard drive. This is not a practical alternative to making backups.

scanning tunnelling microscope. You can read all about this, and several other devious strategies that were state-of-the-art five years ago, at www.cs.auckland.ac.nz/~pgut001/secure_del.html.

In answer to your question, files you deleted years ago are gone, even if you do have a scanning tunnelling microscope lab in your garage. Assuming that your drive has been used normally over those years, any space that was marked free long ago will most likely have been used, and re-used, and re-re-used, many times since then.

A mil-spook friend of mine cheerfully sent me pictures of a multi-DSP box they can use to, for instance, read what a laser printer inside a building is printing by monitoring the noise it creates on the mains supply wires going into the place – in real time.

He wouldn't say what they actually used that thing for, but the places that keep that sort of hardware buzzing away in the corner probably wouldn't have much trouble getting hold of a scanning tunnelling microscope with which to cast an eye over your drive. If you gave them reason to.

But if you've overwritten the data a mere 20 times, I'd be pretty darn startled if anybody on the planet could recover it. Ten times is probably well past the point of no return.

If you're nervous about the NSA reading your transcripts of what the Voices have been telling you, by the way, there are utilities out there that will multi-overwrite data with random hash. Eraser (www.tolvanen.com/eraser), is a good example.

Fuzzy vision

My dad has found an old monitor in a storeroom of his school; it's an NEC MultiSync XV17+. Because it was in the storeroom it obviously had to be broken or damaged in some way, but I'm hoping it can be fixed. The only problem is when I turn it on the picture is very blurry. I have tried degaussing it but nothing seemed to happen.

I think the problem is that it has been exposed to an excessive amount of electromagnetic radiation. The last LAN I went to had a high voltage power cable running through the wall, which made everyone's monitor go fuzzy in the way that this monitor is behaving now.

Nathan Dimbleby

Degaussing won't affect blurriness. You, sir, have a focus problem.

Many current monitors have a hardware focus control located somewhere inside the monitor, and software focus control that is accessible through the onscreen menu systems.

Many older models of monitor, including your XV17+, have hardware focus controls that you can access without opening the monitor case.

That's good, because opening a monitor case when you're not exactly sure of what you're doing is a leading cause of leaping high in the air while punching yourself in the face with both fists and having a cardiac arrest.

Hardware focus controls are cool. All you need is a long, thin Philips screwdriver and five seconds alone with the monitor, and you can turn anybody's screen into an un-viewable fuzzy mess. Or, often, turn a nasty old fuzzy monitor into something that looks halfway okay.

On one side of the XV17+, you ought to see a couple of holes. One of them should have the horizontal focus adjust potentiometer at the bottom of it, and the other one should be for vertical focus. Tweak 'em and see if it helps.

Note: While focus-adjust holes are, obviously, meant to have screwdrivers poked into them, you're supposed to use a non-conductive plastic or ceramic screwdriver, or a very seriously insulated metal one.

I make no guarantees about how easy it might be for someone fishing around inside a monitor with a poorly insulated metal screwdriver to touch something connected to the high tension side of the flyback transformer. It ought to be difficult or impossible, but if you suddenly turn into a golliwog and fly magically across the room, don't blame me.

And don't leave any instructions to your next of kin saying they should point the finger of blame at me, either.

Free motherboard! For a reason!

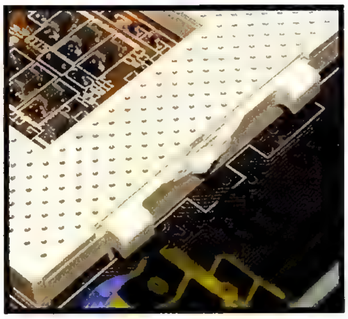
I was recently given a Super7 motherboard, and had grand plans of building the backup system from hell, only to discover that the obvious reason it had been palmed off to me was that the lug on the outside middle edge of the socket had been snapped off.

I was looking forward to doing some CPU freezing to see if I could get a Pentium MMX 166MHz up to 330MHz or higher. It currently pulls 250MHz with a Cooler Master Athlon cooler running at 43°C.

Is there any way to repair the snapped lug? I once stubbled across a suitable method, and thought I'd never need it (stupid me), and promptly lost the link.

I almost forgot; the motherboard is a 5MVP3 Rev: 4.0. I'm not sure which manufacturer, but I do know it has a VIA chipset.

Adam Keast



Hasta la vista, socket!

Since many high-clamping-force CPU coolers attach using just the middle retention hook on either side of a CPU socket, and since the fibre reinforced plastic the sockets are made of is very tough but not indestructible, this problem is not an uncommon one. Especially for people who remove and reattach a CPU cooler several times.

Schemes to repair snapped lugs vary from the merely gimcrack to the completely W. Heath Robinson; the one you're thinking of might be www.overclockers.com/tips284.

There are five other ways to address this problem.

Solution 1: Buy a new motherboard. Hey, it's a solution. Shut up.

Solution 2: Install a new socket. It is possible, though not simple, to remove the whole socket and replace it with a new one. It's easier to do this to a Socket 7/Super7 mobo than a newer one, because the older CPU types have fewer pins. But it's still not easy. Doing it without a good solder/desolder station is less than fun, and doing it without appropriate soldering skillz is impossible. But it can and has been done. I know a guy who did it, and he's in the Air Force, so he can't be that smart.

Solution 3: If your socket still has outer mounting hooks – in other words, if there were originally three hooks on each side of the socket, but now you've lost the middle one on one side – then get a CPU cooler that's made to engage all three hooks. Like, for instance, any of Thermaltake's later-model 'Orb' coolers. Such a cooler will be okay engaging only two hooks.

Unfortunately, your board's socket (which is the same size, for cooler mounting purposes, as Socket 370 or Socket A) has the two-hooks-per-side design.

Solution 4: If your motherboard has mounting holes around the CPU socket, get a CPU cooler that can mount through those holes.

Many top-end overclockers' coolers and water blocks use the bolt-mount method, precisely in order to avoid ripping lugs off sockets with their monster bulk. And water-cooling is not a bad idea if you're experimenting with cryogenic CPUs.

Of course, your motherboard doesn't have mounting holes, either, so that's out for you.

If you're wondering how I know all about your motherboard, it's because my spider-sense tells me it's a Lucky Star board – www.lucky-star.com.tw/products/mainboard/via/5mvp3.htm.

Solution 5: Thermal-glue a cooler to the CPU. If you attach the cooler (or water block) slightly off-centre then you'll still be able to work the Zero Insertion Force socket lever. And the flat-topped Pentium 166MHz won't mind having something stuck to it with aluminium-loaded epoxy, or your choice of other thermal adhesive.

R2-D2 dialects

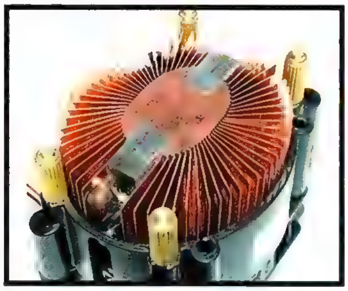
Why is it so hard for freakin' motherboard manufacturers to come together, sit down and decide on a set of standard beep codes for motherboards? I mean really, is it that hard?

I hate trying to figure out what the problem with an unbootable system is when each motherboard has its unique set of beep code meanings, and I mean really . . . who the hell can find their motherboard manual when they want it?

So my question is, are there any plans for the future when motherboard manufacturers finally decide on a standard set of beep codes?

APoLLYo|\|

A Silverprop (www.silverprop.com) Cyclone water block, showing off more mounting bolts.



A Zalman (www.zalman.co.kr) CNPS5000-Plus CPU cooler, which bolts through the motherboard.

AMI, Award, Phoenix and IBM (and less important BIOS makers) never managed to agree over standard codes, back when all PCs reported missing video cards, stuffed RAM and similar startup problems with vaguely Morse Code-ish beep sequences. Heck, different BIOSes from the one company can have different beeps.

Hey, that's an open platform for you; if it doesn't cause actual incompatibility or cause customers to smash your windows, nobody gives a damn.

If you want to decode the beeps and you've lost your paper manual, you may be able to find a cheat sheet on the motherboard manufacturer's site, and manuals are commonly downloadable these days, too. That doesn't help you if you've got an elderly board, or if the computer that doesn't work is your only PC.

There's hope, though. Most motherboards still beep for errors, but there are a range of other solutions nowadays. Some boards use diagnostic LEDs. These aren't that much better than beeps, because you still have to look up the number on the two-digit display or the light pattern on the little stack of red/greed LEDs. Other boards, though, like the ASUS P4B, speak their errors instead of beeping them, and are able to do so in several languages.

So as long as nobody's set your mobo to Español, it's now possible to tell that the board thinks its CPU is toast without looking up 'BEEEEEP-bip-bip-honk'.

Finding out whether the CPU really is toast, is another matter. But every little bit helps.

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Building an LED caselight

You thought installing a neon light was hard-core? That was only the beginning. Dan Rutter takes it to the next level.

OK, so you've got the stylin' case with the side window. And the multiple fans that may, at any moment, suck your video card out through one of the blowholes. You may even have the water-cooling rig, replete with expensive pearly silicone tubing.

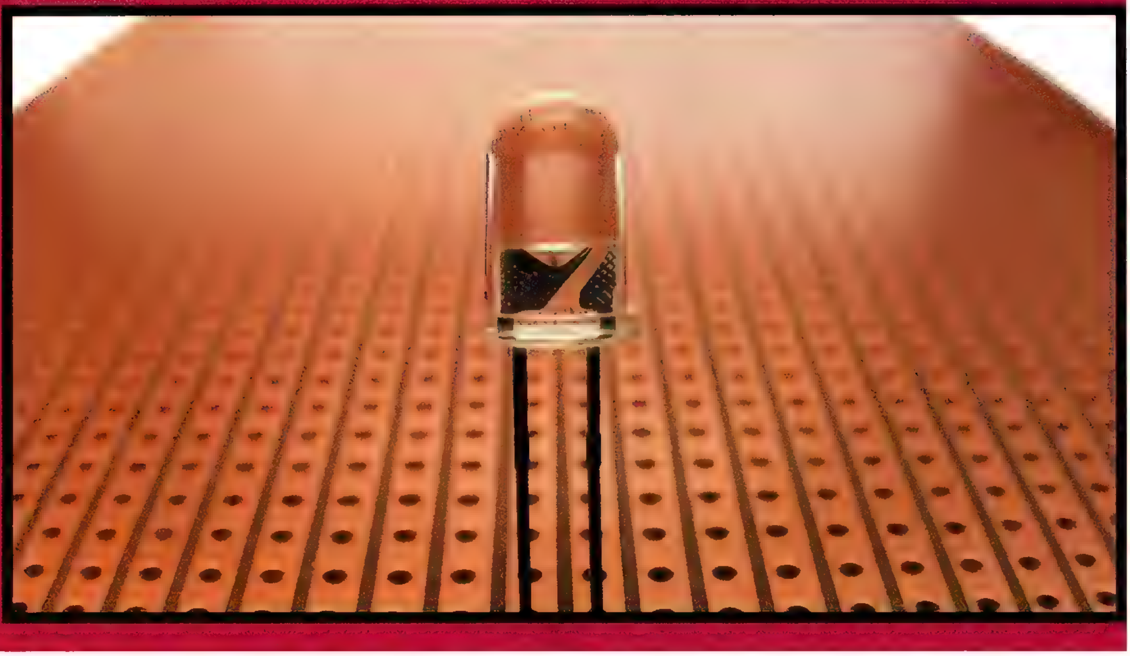
As surely as a panel van must be decorated with an airbrushed picture featuring pectorals and mammaries, your computer must have a light inside it. Want one that'll give you more than ten years of constant light and not take up much space? Then you want LEDs, baby. It's quite easy to make a bright light by assembling an array of dozens of them.

Inside an LED

A high-intensity LED. All high-intensity LEDs have a 'water clear' lens, which lets you see the works if your eyesight is good enough.

The larger terminal with the conical reflector cup in it is connected to the negative lead (the cathode); the smaller terminal is the positive one (the anode).

There's a very fine gold wire extending from the positive terminal to the middle of the negative one; it connects to the tiny 'die', which is what emits the light. And what a bright little light it is.

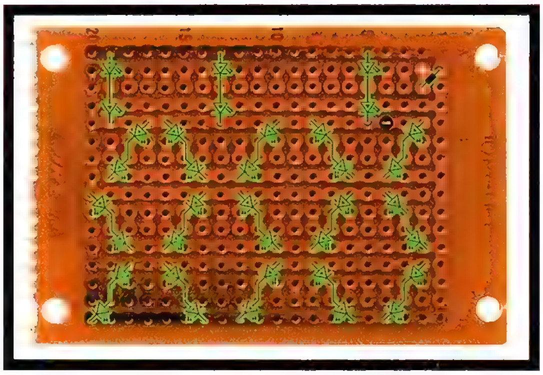


Laying it out

It's perfectly possible to just plunge into making an LED array – it's not like it's a time machine or a particle accelerator, or anything approaching such levels of difficulty. The basic idea is actually pretty simple.

If I were you, though, I'd at least make sure I knew the rough board arrangement I was aiming for, and checked to make sure that every LED string started on a positive rail and ended on a negative one. Minor stuff like that.

If I wasn't writing an article about doing this, my layout sketch would have been a very back-of-a-beer-coaster sort of thing. But I'm getting paid to do this, so it isn't.



ⓘ The rough layout of the LED positioning.

I decided on an array of 18 strings of two LEDs, which fit comfortably on this little board without overcrowding it.

The red and black circles are where the power wires connect; note how the red one is on one of the little not-connected-to-anything two-hole islands, and is linked to the track I'm using as the positive rail by the array's current limiting resistor.

With strings of only two red LEDs, I only needed a roughly 4V power supply for this array. So if I ran it from 12V, I'd need a current limiting resistor with a value of about 22 ohms (see the 'Amps, volts and resistors' box). But it would need to be able to handle the roughly 360mA I wanted to flow through the 18 20mA LED strings, and that means it would need about a 3W rating.

That's a rather chunky resistor, even if you can find an actual three-watter and don't have to opt for a 5W wirewound. And I didn't want 2.88W of heat coming just from the resistor, plus the heat from the LEDs, inside the sealed box.

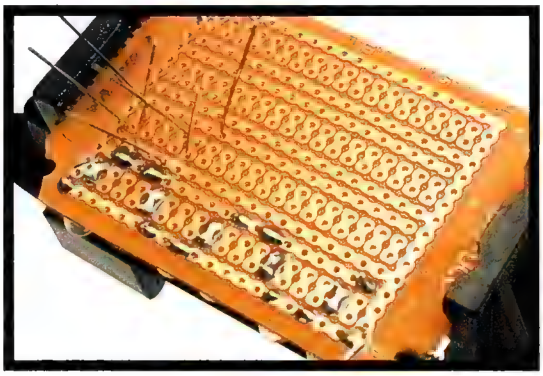
So I re-wired the power connector to connect to the 5V line from the PSU (the red wire) rather than the 12V (the yellow wire). Now the resistor only had to drop about 1V instead of about eight. Sticking with the standard formula:

(5-4)/0.36=R

I gave a resistor value of approximately 2.8 ohms, and only 0.36W power dissipation, which is much more reasonable.

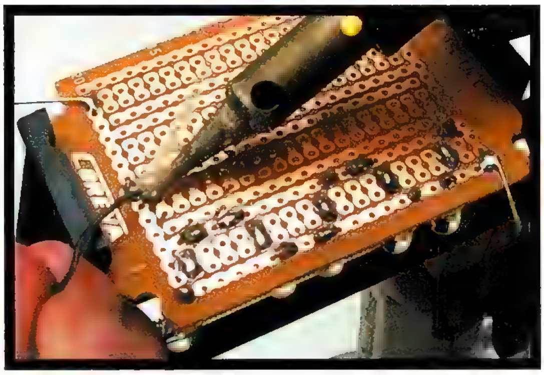
Putting it together

An LED array is a simple circuit. There may be a lot of components on the board, but you're really just doing the same thing over and over. And over and over and over. In case you hadn't guessed, it can be quite a repetitive process.



ⓘ Inserting the LEDs.

Insert LED, make sure long leg is at the positive end, trim legs to length, solder.



ⓘ Soldering the LED into place.

I used a cut-clinch-and-burnish tool to cut the component legs off and smash them flat against the board, which effectively stops the LEDs falling off the board before you solder them. You can also, of course, solder and then trim, but that weakens the solder joint a bit.

You don't need to be a soldering artiste to get it right. Then again, it's probably handy if you've at least got a little experience with soldering.

Make sure you don't bridge tracks that you don't mean to. Don't use a monster iron that'll lift the copper off the board. Take your time. Try not to breathe the lead vapour unless you don't particularly like life.

Don't worry about lining up the LEDs perfectly; you want a somewhat diffuse light anyway, and a frosted, plastic project box will hide any higgledy-piggledy component placement.

Note, by the way, the temporary contact wires tacked to the corners of the board in the above picture. They let me easily alligator-clip it to my bench supply to check it.

They also let me test the completed array before I put its limiting resistor on.

Doing that showed me that, when it was cold, the array drew 234mA at 4.1V (2.05V across each of the LEDs in all of those two-LED strings). Which was fine.

When it warmed up, though, it drew almost 300mA at only 2.8V. There's that thermal runaway problem for you; if the array had still been provided with 4V, LEDs would be popping.

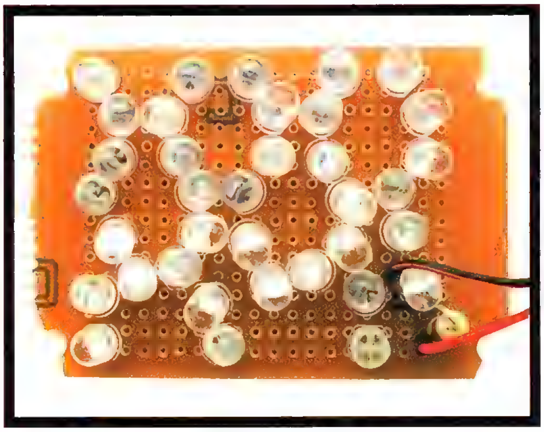
A bit of twiddling revealed that about 3.85V was a good input voltage to keep the LED strings at around 20mA each, even when warm, which was where I wanted them to be.

From a 5V supply, the resistor calculator formula worked out at 3.2 ohms with those numbers.

A standard resistor value is 3.3 ohms, giving me a little extra safety room, which is always a good thing when working with electronics, so that's the resistor I decided to use. As they say, it's better to be safe than sorry.

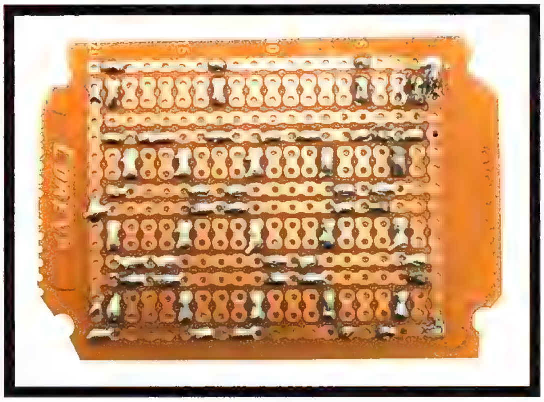
▷

‘At 20mA, the quoted life span for a common high-intensity LED is around 100,000 hours. That’s over 11 years of continuous operation.’



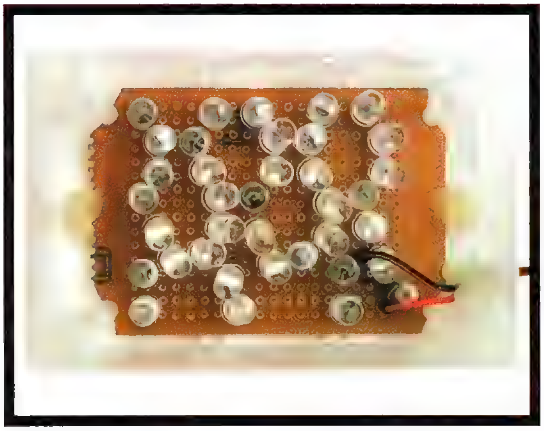
The board with LEDs soldered in place.

And here’s the result. Of course, feel free to invent your own pretty shapes.



The rear of the board once soldered.

. . . and the back of the board. Note the clipped-off corners to get the board to fit into the little project box it will soon call home. Before you attach your power wires, thread them through a hole you’ve made in your project box. Poke the hole with your hot soldering iron if you’re using an all-clear box.



The board in the box.

A couple of dabs of hot-melt glue to hold the board down and provide strain relief for the cable . . .

And finally the lid is screwed into place.

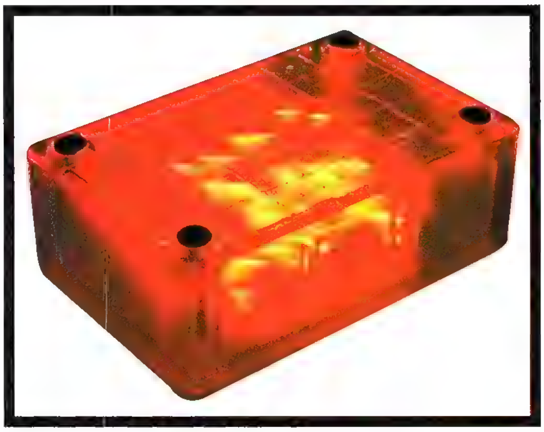
Then screw on the lid and your new Knight Rider wannabe LED project is just about done.

Now we need to test that your LED box won’t burst spontaneously into a shower of pretty fireworks when you fire it up. For this, we used the most scientific test known to humankind...

No, the interior of this PC isn't on fire.

The smoke test! I wrapped the caselight in a blanket and left it running for a while; it peaked at 370mA. That's only 20.6mA per LED, and about 450mW dissipated by the resistor. Bewdy.

Oh, yeah. Does it work?



Ooooh, a glowy box. Yummy!

Yes. Yes, it does.

In the average case, it's easy to mount a little light like this with double-sided tape in various spots. It's certainly easier than mounting a neon tube.

At 20mA, the quoted life span for a common high-intensity LED is around 100,000 hours. That's over 11 years of continuous operation. If you only have your computer turned on for, say, eight hours a day, then you can triple that figure to get the light's service life.

At the end of their official life span, LEDs don't go ping and stop working like an incandescent bulb. If you don't overdrive them, they just get dimmer and dimmer over a long period of time.

So, I wouldn't be surprised if this thing was still bright enough to use as a reading lamp after 50 years of continuous use.

The parts cost about $60. Less, actually, because the LEDs were on special.

LED primer

LEDs are a bit like normal light bulbs. You pass electricity through them and they glow. If you pass too much electricity through them, they die.

There are some important differences between LEDs and incandescent lamps, though.

First, LEDs are diodes, so they have polarity; they only work one way. The long leg of an LED is the positive one; if you connect it backwards, it won't do anything. It won't be hurt, either, though. Anyone who's assembled a computer and connected the case LED plugs backwards will know this already.

Second, LEDs need some resistance in series with them, either as part of the power source (if it's a small battery, for example), or as a separate resistor. This is because LEDs have a death wish.

Incandescent lamp filaments have a positive temperature coefficient of resistance; when they get hotter, their resistance rises. They get very hot with normal use, and their resistance is much higher then than when they're turned off. More than ten times as high.

LEDs aren't like that. They've got a negative temperature coefficient of resistance; the hotter they get, the lower their resistance becomes. And they warm up in normal operation – they're not magic 100% efficient electricity-to-light converters, but waste some power as heat, just like everything else.

If an LED is already passing enough current then a bit more power dissipation will kill it, and if there's nothing – like a series resistor – to stop the heat-related resistance drop from allowing the LED to dissipate more power, you've got a situation called 'thermal runaway', and your LED is not long for this world.

Overdrive an LED relatively gently and it'll briefly emit colours rather higher in the spectrum than the ones it's meant to produce, and then die, with a very small sad sizzling noise.

The thing you are left with after this is referred to as a 'friode'.

If you overdrive it brutally, an LED will still end up as a friode, but it will in the interim briefly function as an SED, or Smoke Emitting Diode. While useful for brief periods to signal your brothers in far-off tribes, you'll still want to avoid this situation.

Ex-SEDs are always open circuit, but more gently killed LEDs can end up short-circuited, which is worse. When a shorted LED is in a series string with other LEDs, they get to experience all of the voltage that was meant to supply the whole string. This, of course, accelerates their own death.

Stuff you'll need

There are several things that you must have to make an LED caselight, and several other things that you don't have to have, but which help.

You'll need a soldering iron for a start. Nothing fancy; a 20 or 25W sub-$20 cheapo iron will do, as long as it's got a fine tip. Giant plumbing irons, soldering guns or metalworking irons that you heat up in a flame are not what you want.

If you don't have a soldering iron, all electronics stores sell cheap starter packs that give you a basic iron, a stand, a tip-cleaning sponge and some solder. Jaycar's (catalogue number: TS-1650) costs $34.95. If you already have a soldering iron, then you presumably also have these other accessories, unless you only use the iron for interrogation purposes.

You'll also need a skill vaguely resembling an ability to solder. If you've never soldered before, it's not hard to learn. There are lots of how-to-solder guides available online. Try www.epemag.wimborne.co.uk/solderpix.htm or www.aaroncake.net/electronics/solder.htm, for example.

And you'll need a passing familiarity with elementary electronics concepts, like Ohm's Law. Online guides like http://webhome.idirect.com/~jadams/electronics/ will tell you all you need to know.

Apart from the iron and accoutrements, the only tools you'll need are side cutters, for trimming component leads so they don't stick out on the other side of the circuit board like porcupine quills, and a wire stripper, if you don't think your teeth are up to it.

And you'll need some parts.

In this instance, LEDs, veroboard, a box and a power connector cable. Yep, that's it.

First up, of course, are the LEDs. You'll need some.

Your LEDs must be identical if you want simplicity of design; you can have a light with multiple flavours of LEDs if you like, and do all sorts of fancy switching tricks as well. But if you do, each flavour of LED should be on a separate circuit, in parallel with the others, with its own current limiting resistor.

I made an all-red LEDs light, using Jaycar's ZD-1777 LEDs. For quantities of more than 25, they list for $1.45 each. If you're building a red case light, you'll want more than 25 LEDs; the higher up the spectrum you go the more you'll pay per LED, but the fewer LEDs you'll need thanks to the way the human eye perceives light.

Don't buy exactly as many LEDs as you think you'll need. Get a few spares. Especially if this is your first attempt at this sort of thing.

The box I used is Jaycar's HB-6005 clear project box, which costs only $2.95. Its frosted finish produces a nice diffuse light.

The cable thing in the above picture is a PSU-to-3-pin adaptor, which comes with various CPU coolers to allow people to run the CPU cooler fan in computers with no 3-pin headers on the motherboard. There are only two wires going to the fan connector, but they're all you need: they're +12V and ground. The third wire in a three-wire lead is the fan tachometer connection.

Hack apart one of these fan connectors and you get two wires terminated with neat-o pins that are about the right size for poking into a circuit board hole. And they're pre-wired to a pass-through Molex connector, ready to connect to your computer PSU.

You can buy computer power connectors separately and wire them up yourself, of course. You could put a drive power receptacle on the side of your caselight's enclosure, or just hard-splice its supply wires into a PSU lead. But this is another straightforward solution.

You'll also need an appropriately rated resistor to suit whatever array you intend to make (see 'Amps, volts and resistors'). Resistors are cheap and available in a wide range of power ratings and values.

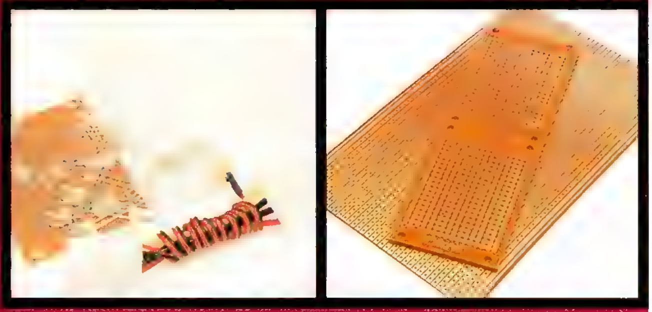
What do you attach all of the components to? Well, if you've got time on your hands, you can etch yourself a beautiful circuit board. If you're somewhat more sane, you'll use 'veroboard'.

This is a ordinary single-sided circuit board with a pre-applied multi-purpose copper pattern on it. It makes it quite easy to create simple circuits like an LED array. It probably isn't made by Vero Electronics any more, but 'veroboard' is a trade name that's stuck. It sounds better than 'perforated stripboard prototyping medium'.

Well, sorta.

If you want to make a really humungous LED array, then you'll want a large-ish sheet of veroboard, like the big one in the picture below. The thing sitting on top of that, though, is Jaycar's HP-9556 'Ultra Mini' veroboard. This is actually two identical snap-apart boards, and it costs a big $3.80 for the pair.

If you're not confident with your resistor-picking and LED-soldering abilities, do a dry run with ordinary low-intensity LEDs, which you can get for less than 15c each if you buy a bulk pack of 100. These LEDs aren't bright enough to put in a box – you can forget about trying to light up anything with them – but they work in much the same way as their more expensive high-intensity brethren, and veroboard is cheap enough that there's no need to even bother removing them when you've finished fooling around with your practice run. You can just get another board.



Now, the list of things you don't have to have, but which will help.

A desoldering doodad of some sort. Unless you're naturally perfect, you will need to unsolder things now and then. It's much easier to do that, and to re-use the spot where the removed component was, if you've got something with which to remove the excess solder plugging the hole.

'Solder wick' is woven copper ribbon that sucks up molten solder. Spring-action solder suckers are also popular, and inexpensive.

Get a multimeter – a $15 cheapie will be fine. Without one, you're left crossing your fingers and hoping that your LEDs are running at the current you think they are.

While you're at it, get a second multimeter – or one fancy one with two sets of inputs. It's nice to have one meter in series with your LED array, telling you the current it's drawing, and another one across its inputs, telling you what voltage it's seeing. With two meters, you can watch what happens as the LEDs warm up, the current rises, and how the voltage falls across the array.

It's a blast. Seriously. Stop looking at me like that!

Got more spare money? Oh good, I'm sure we can find a way to blow it all for you. Spend it on a variable-voltage power supply. For electronic-testing purposes, bench supplies with variable voltage and variable current are great; you can tell them not to supply more current than whatever you know is safe for the thing you're playing with. This should ensure you'll blow up far fewer items.

> **'A series chain of LEDs behaves, electrically, like one unit with the same current draw as a single LED but the voltage drop of all of the LEDs in the chain put together.'**

Amps, volts and resistors

With a reasonable heatsink, you can push more than 50 milliamps (mA) through modern high-intensity LEDs. The rated safe-at-any-temperature current, though, is typically less than 30mA; 20mA is the usual current you'll see on the spec sheet.

That spec sheet will also tell you the nominal forward voltage for a given LED, which'll be around 2.0V for red and orange LEDs, around 2.2V for yellow and green ones, and substantially higher for the more expensive blue LEDs – they're generally rated at 3.0V to 3.6V.

White LEDs have similar ratings to blue ones because they actually are blue ones – they have a phosphor layer over a blue LED die, which absorbs most of the blue and emits a range of other frequencies to give you a broad spectrum white result.

You can wire identical LEDs in series or in parallel. If you're making a large LED array, you'll probably be doing both.

A parallel-wired array of LEDs, with each LED connected directly to the same power supply as if it were wired up by itself, and no electrons having to flow through one LED to get to the next , behaves, electrically, like one big unit with the same voltage drop as a single LED but the current draw of all of the LEDs in the array put together. So, for instance, six 2V/20mA red LEDs wired in parallel will run from 2V but will draw 120mA.

A series chain of LEDs behaves, electrically, like one unit with the same current draw as a single LED but the voltage drop of all of the LEDs in the chain put together. So, for instance, six 2V red LEDs in a chain can be run from 12V.

You can wire series LED arrays in parallel with each other, too. Take two chains, each containing six 2V 20mA LEDs, and connect them in parallel; the resultant series-parallel array will run from 12V and draw 240mA.

Because LEDs change resistance with temperature, though (see the 'LED primer' box), you can't just connect such a '12V' LED array to any old 12V power supply. Like, for instance, the 12V rail from your computer PSU.

Well, you can – if the LEDs really do start out drawing only 20mA, then they might well not get hot enough to die out. But it's still not a great idea.

To take the edge off the thermal runaway problem, you use an in-line resistor and a power supply with a higher voltage than the array wants. Resistors do not significantly change in value with the amount of current flowing through them.

The resistor eats some of the volts and damps the runaway by a varying amount, depending on its resistance value compared with the effective resistance of the LED array. In practice, you don't need a lot of in-line resistance.

The formula for figuring out what resistor value you need for a given LED, or LED array, is simple. It's basically just Ohm's Law.

Ohm's Law tells you exactly how any simple DC circuit like this will behave. It can be stated as $V = IR$ – voltage (in volts) equals current (in amps) times resistance (in ohms).

Shuffled around to solve for R, this is $R = V/I$.

To find your series resistance value, you make V equal to the difference between the supply voltage, Vs, and the voltage you want across your LEDs, Vr.

So here's that formula:

$$(V_s - V_r) / I = R$$

Let's say you've got a chain of three 2.2V LEDs (so Vr is 6.6) that you want to run at 25 milliamps (so I is 0.025, because there are 1,000 milliamps in an amp) from a 12V supply (so Vs is 12). Now, the equation works out as

$$(12-6.6)/0.025=R$$

and R equals 216 ohms. A resistor value of 216 ohms isn't standard, but 220 is; you can use resistors in series or parallel to exactly make up a non-standard value, but a 220 ohm resistor will work fine here.

The next thing you have to do is make sure your resistor can handle the job.

Resistors come in many shapes and sizes, from tiny 1/8th-watts and smaller, to huge heatsinked multi-hundred-watt monsters. If you ask, say, a 1/4W resistor to dissipate 1W, you'd better have a pretty strong breeze blowing over it, or it'll burn up.

In this case, the resistor's dropping about 5.4V to give the LEDs the 6.6V they want, and it's passing about 25mA. Power (in watts) equals voltage (in volts) times current (in amps); 6.6V times 0.025A equals 0.165W.

So a 1/4-watt resistor would be fine in this application, but an 1/8th-watt would be overstressed.

See? Science and maths can be fun, if only to make your PC prettier. Pretty PCs run games better, as we all know. Now we've just got to figure out how to make your PC speak to you like KITT, with an attitude to match.

URLs:

- Dick Smith Electronics: www.dse.com.au
- Jaycar Electronics: www.jaycar.com.au
- Don Klipstein's site, with lots of LED and other lighting info: www.misty.com/people/don/index.html
- Basic Electronics: http://webhome.idirect.com/~jadams/electronics
- How-to-solder guides: www.epemag.wimborne.co.uk/solderpix.htm, www.aaroncake.net/electronics/solder.htm

May the letters be with you

This is the place to get all of your problems off your chest. Think of it as the Oprah Winfrey page for computer freaks. This month's LOTM and POTM both score a Belkin n50 Nostromo SpeedPad, courtesy of Belkin. Which, according to the review on page 56, is the first replacement for the keyboard that actually works. You go Belkin, you good thang!

Hard drivin' typos

In issue eleven of Atomic, when you reviewed the Mass Storage Enclosure, you said that FireWire's maximum throughput was 400MB/s. That is very fast. Are you sure you didn't mean 400Mb/s? That's what I've read elsewhere, which sounds much more realistic than 400MB/s.

Minh

Don't you just hate typos? You are 100% correct in saying that FireWire has a maximum theoretical bandwidth of 400Mb/s. Consider Atomic chastised.

A cover CD for all occasions

I received my first subscription copy of Atomic yesterday. Imagine my surprise at finding a cover CD, and WHAT A CD!

The time this will save is incalculable. The person who came up with this idea deserves a huge pat on the back. This CD is the must-have of must-haves and you have beaten every other magazine to the punch. It is worth the price of the subscription alone. This one will receive pride of place on the shelf. Thank you. But, it would be nice to know what you left out.

S.J. Spencer

We're glad you liked our shiny disc of joy so much. We aimed to make it something our readers could use as a tool, as opposed to something that stops those annoying rings of coffee on desks.

As for things we left out, there's an amusing video of Bennett singing 'It's Raining Men' floating around the office network, but strangely enough permission to include this piece of amusing footage wasn't exactly forthcoming. We can only wonder why.

POTM: Atomicans, really great people

Post of the Month goes to Baner86, for reminding us why Atomic and its thriving community exists. Atomic isn't just a magazine; it's a way of life. There are a huge number of Atomicans who like nothing better than to save their fellow Atomicans time, money and heartache, and judging by posts like Baner86's, they aren't doing too badly. Who says we can't change the world?
Head over to the following URL to see the full thread:
www.atomicmpc.com.au/forum.asp?cat=ge&top=21201

"Atomic has been my saviour and my guiding light in the world of computing. Me and my father used to be those people who were easily ripped off by cheap computer merchants, giving us crap hardware for premium prices.
But one day, after school dad came home with a copy of Atomic, issue 6 if I remember correctly. At first I was embarrassed by the scantily-clad woman on the cover but after getting over that, I read the magazine in earnest and what a magazine it was..."

Baner86

Captain Atomic = large electricity bill

It has been a month now since Captain Atomic inadvertently used his streaming power, and entered his computer. And now Ultraviolet has entered into her machine in search of him (it's funny watching all this on the screens). Captain Atomic, after escaping from his FPS directory, has travelled through my switch, bypassed my firewall and entered my PC. I wake up in the morning with the startup sound changed to him saying 'Optimised by mmeeeeee!' only to discover that he has been tossing my icons all over my desktop, which apparently he thinks is amusing. Unbeknownst to him, this is doing hell to my electricity bill. But he has finally returned to his computer after I told him (through net_send) to get out of my pr0n folder. I hope Ultraviolet finds Captain Atomic fast!

A very worried Fraggs

The good Captain strikes again.

Numbers suck

In response to the benchmarking utilities that are available these days, I just want to know if these numbers actually mean anything. I can understand professionals like Atomic using them to do reviews, but are they of any use to the home user? I mean, if someone overclocks their CPU an extra 100MHz but doesn't notice any difference in frame rates or performance, then what do the extra points in the benchmark really matter anyway? Atomicans of all people should already know by now that numbers have no significance in the way a PC performs. So, therefore, there is no point overclocking, tweaking or upgrading if you cannot notice any increase in performance. We are running a PC, not playing a basketball game, trying to score the most points, so don't do something just because a benchmarking utility says you will score a few extra points in doing so. Everything these days is rated as numbers. Whatever happened to just doing or buying something because you like it, not because the numbers are higher? Cheers.

Martin

When it comes to reviewing equipment, benchmarking is vital to prove a component's superiority over another competing device. As for the home user, benchmarks are an invaluable tool to check that the tweak you've just made hasn't had the opposite effect. And don't forget, big numbers are cool, OK?

'I still had a frisbee'

'I have a dilemma. I need a viable broadband solution to play games.'

Is there life after frisbees?

Finally, a cheap alternative to taking CDs that once whizzed through the backyard, off the cat, through a window and embedded itself in the neighbour's skull (I don't condone violence unless it's a sport and the annual CD/Frisbee-Tossing Champs is now officially a sport).

One of your most helpful readers wrote to your magazine singing the praises of a most stupendous product that would remove small scratches on CDs. So at once I set out on a most wondrous journey to my local supermarket to obtain the necessary tools. After about an hour I found the magic liquid hiding at the back of the shelf in a dark isle. At the checkout the spotty, inbred, gum-chewing, cross-eyed checkout girl requested 'Price on Mr Sheen, please, for Lane 2. Price check on Mr Sheen for Lane 2.'

Anyway, to cut a long story short, I got the stuff home and proceeded to drench one of my CDs in Mr Sheen. I waited a whole two hours, then wiped off the gunky stuff and – low and behold – I still had a frisbee. Now I know the guys and girls at Atomic are into testing everything, but it seems not this time. I can't believe that you wouldn't have one or two discs lying around the office that you had either accidentally scratched or hated so much that you just had to. Please don't consider this a complaint; just a small tremor in the force. Maybe in future you could benchtest any silly ideas your readers come up with. So its back to the CD-throwing championships.

Yours Sincerely (and $5 poorer),
Geoff

Unfortunately, we can't test out every reader's theory that is submitted for our Letters pages. But we have to say that we've heard from many different sources that the Mr Sheen shenanigans do work, provided your CD isn't totally munted. We guess that yours was just a tad too naffed, even for the powers of the mighty Mr Sheen.

More Telstra praise

I have a dilemma. I need a viable broadband solution to play games – CS in particular – and I've discovered that Aussie broadband sucks.

At the moment I have two connections: Austarnet's Broadband Satellite Service ($50 per month – 256K/33K) and iPrimus's Infinity Metro Dial-Up ($25 per month). Austar, which is great for surfing and downloading, is terrible for games – I have a constant ping of 1,500 that occasionally escalates to 6,000. iPrimus gives me a ping of around 250 until I actually enter the game, where it increases to 6,000. Apparently – after talking to Austarnet, iPrimus, Optus and Telstra – Telstra has put in cheap pair-gain phone lines that won't connect

LOTM: Atomic gets suckered

Uh oh. It looks as if the Atomic news-gathering AI got severely conned. Letter of the Month goes to sph38 for pointing out what a bunch of freaks and l0s3r5 the company we mentioned in issue 10's news piece, 'Deeper than blue?', is. It just goes to show that you can never trust a press release from a no-name small-time company.

Dear Atomic,
Reading your recent article on supercomputing (issue 10, 'Deeper than blue?') sparked an interesting discussion in our lounge room. It became even more interesting after a couple of Google searches. Many of the articles about this IT company seemed to keep trying to take us far away from our dear old planet Earth, to a place called Roswell.

Most of the pages we found about the American Computer Company (ACC) and its founder, Jack Shulman, were very interesting. Among other things we found were ACC's claims that transistors were discovered from analysing the wreckage of a crashed spacecraft at Roswell. Further, the company claims it is being harassed by CIA agents with mob connections and that it had its servers hacked by the security company that provides security for Area 51.
I recommend that you and your readers follow these links:

www.google.com/search?sourceid=navclient&q=%22american+computer+company%22
www.imaginationinternet.com **(especially the bit on (Al)kanes and (al)uminium) :)**
www.geocities.com/CapeCanaveral/Hangar/9587 **(The accuracy of these quotes is not guaranteed, and I didn't listen to the sound files, but here's one of them.)**

Jack Shulman (Head of ACC?): 'I don't know that we have the handling capabilities to build [garbled] . . . frankly, 80 million volts is a lot of volts. It's a lot of power. Particularly at the current and type of coil, and the type of materials they use for this conversion chamber. Not understanding what it does, frankly, I wouldn't want to be the one to blow one of these things up. Ya never know what might happen . . . a small nuclear explosion or something, but uh . . . I guess the bottom line is that 80 million volts has been theorised as a functional theoretically potent level of electrons that might in fact have the local affect of [garbled] the space-time continuum, actually. It was suggested that you could create fusion with 80 million volts of electrons.'

It seems your amazing American IT company with its TCap technology and terrahertz actually didn't invent anything at all. It was stolen from the same green men that gave Bell Labs its transistor.

I myself have been in contact with these so-called aliens and, after my prolonged abduction, they happened to let slip that their TCap technology only allows for speeds of up to 30GHz per square second.

We hope this information is at least as informative as that of the aforementioned sub-Atomic article.
Simon (Krylloan) Hill
Cody (Cody) Hatch
Mike (HURRICANe) Hurrix
PS: My flatmate Danny believes in you, and has been trying to convince us of the truth of your article (and his sanity).
sph38

'There is nothing worse than playing a game for the first time, getting all gooey over the graphics, then shelving it an hour or so later because the graphics were the only part of the game that caught your attention.'

better than 31Kb/s. This is clearly not enough bandwidth for even an ordinary user. Telstra has done this to all the new estates, including mine.

I realise that you are all wondering why I don't just get cable. Well, Telstra decided against cabling our street but continued to cable 100m down the road for some reason!? I would gladly pay $150 per month for cable with a gig cap (I'm that desperate), but now Telstra has said it won't be cabling for another 10 years (WTF???), so I thought ADSL would be the way to go.

Apparently, pair-gain phone lines don't have the bandwidth needed for ADSL (yet they are putting them in all new estates?!?). This is a serious problem. As far as I can tell, the only way I can play games online is to move house (that's not going to happen), leave home (I am only 14) or go LANing every night (I go weekly to a four-hour LAN party, but that's not enough). I believe Telstra needs to clean up its act. Australian broadband is severely lacking when compared to other countries such as America. Telstra, can't you do anything right?
Matt Dwyer

What can we say? Australia has woeful broadband options, but hopefully over the next year or so ADSL should go some way to rectifying that. As for the paired gain problem, we suggest using a couple of tin cans tied together with string as a possible solution.

When candy loses its flavour

In a recent issue of your magazine, Bennett Ring proclaimed that he wanted 'candy'. Now, I am not totally against Mr Ring's point of view; these days a game needs a certain amount of candy to make your average gamer go 'ooohhh, aaahhh' and buy the game, but it also needs to have an equal or greater amount of gameplay to keep me interested. There is nothing worse than playing a game for the first time, getting all gooey over the graphics, then shelving it an hour or so later because the graphics were the only part of the game that caught your attention.

Take, for instance, Emperor: Battle for Dune. This has to be one of the prettier games recently released, but after playing it for a while I realised that Westwood hadn't made any gameplay changes to this game from Command & Conquer and, dare I say, Dune 2. While the gameplay was fine for C&C, it lacked something in Emperor, and candy wasn't going to make up for it.

Maybe my 1.4GHz AMD, GeForce2 MX machine is not as state-of-the-art as it was a few months ago – in fact, it's probably time for my quarterly upgrade – but even the fact that it's not state-of-the-art doesn't stop me from wishing that a few more CPU cycles would go into AI and that more time was spent on gameplay than on flashy graphics, just so a few more copies of the game are sold.

Original and enticing gameplay is what makes me keep coming back to a game six months, one year or even two years after I initially purchased it, because in that time a number of games have, more than likely, been released with far superior graphics engines and candy. I am not alone in this sort of behaviour; I know a number of gamers who would rather play a good old game than a mediocre new one.

As for first person shooters (FPS) being one of the most popular genres around, I agree. But I believe that it's due less to candy and gameplay than it is to the fact that FPS games tend to be easy to pick up and give almost instant, gratifying results. I think that some gamers tend to get bored by some games because they can take quite a while to get to the action, whereas with FPS games you are normally thrown in the deep end where you have to blast your way out.
Christian Blackburn

Bennett's reply: You raise some very valid points. I totally agree that beautiful visuals shouldn't come at the expense of great gameplay, but my column was referring to the people who like to think of themselves as hard-core and bag out a game purely because it looks good. Yes, these evil people do exist.

The Atomic Ten Commandments

Here are the Ten Commandments I promised for all the Atomic people whom I love/adore/admire. Thanks for the mag. Anyway, here's the stuff:
Atomic Bible, Sudoxe 20: 3-17

1. Thou shalt read no mag before Atomic.
2. Thou shalt not make casting judgements upon those in the Atomic world.
3. Thou shalt not misuse the Atomic name, for the Gods shall hold anyone guiltless who misuses it.
4. Remember the Glory Day in which all shall bow down to AMD when it made the Thunderbird AXIA.
5. Honour thy hard drive and motherboard so that thy may cool and be overclocked to thy limits.
6. Thou shalt not murder thy CPU.
7. Thou shalt not commit pultry. (hey, it rhymes).
8. Thou shalt not steal others' RAM at LANs (Honshaft, THIS MEANS YOU!!!).
9. Thou shalt not give false testimony against anyone in either the Atomic forums or #atomicmpc.
10. Thou shalt not covet thy fellow's PC – unless, of course, it is |3373r than thy own.

There you go. Hope you have a bit of fun with them. And if anyone wonders, I go to a Christian school, so don't sue me.
Fat Man

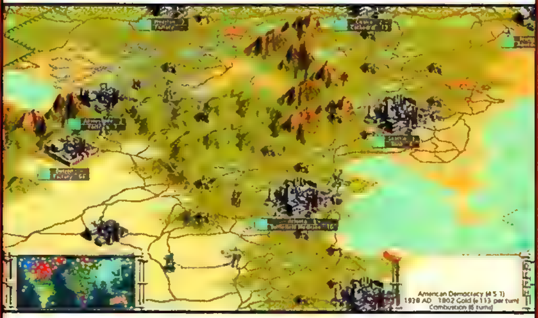
All hail Satan!

A win away, a win away . . .

The lion sleeps tonight, but you could haul in some spanky booty. We've got goods to go here at Atomic.

Civilization III

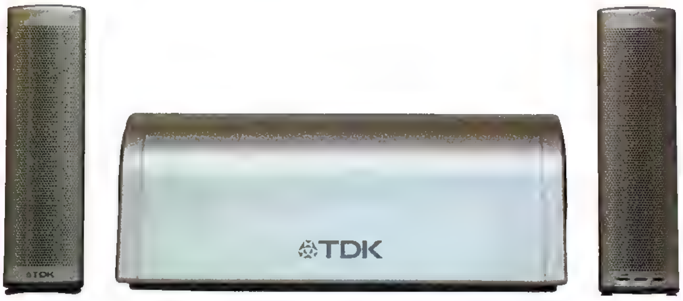
Build your own empire, just like we did at Atomic. No game will suck the life out of you like Civ III. Cop some from Ozisoft. There's 5 x Civilization III to win, plus 1 x Sid signed Civ for the El Grande winner!



Q. Who was the great trading race of the Mediterranean?

TDK Tremor S150 speaker system

This baby is equally comfortable playing your Britney MP3s or pumping the double-shotty in Serious Sam. It looks great too, if you're into beautiful things. The satellites are skinny but good, while the subbie looks tubular. Put one under your desk and vibrate.



Q. What's the proper name for a sound-absorbing chamber?

Logitech MouseMan Dual Optical

Abiding by the always true 'more is better' rule of life, Logitech stuffed not one but TWO optical sensors in its latest handrest. And we've got two of them to give away. There's science for you. It's a nice grey colour on top, so it'll perfectly match your other grey things.

Q. What's the name of the type of opera singer who's been surgically modified down there?

IL2 Sturmovik + Thrustmaster

Singing jolly songs of glory as they flew to an almost certain death, the Kombat Aviatorskis of the Russian Air Brigade had it pretty miserable. Relive their depressing lives with this ripper of a game from Ubi Soft. It's great.

Q. How many variants of the Bf 109 were there?

Email entries to win@atomicmpc.com.au or post them to: Atomic, Competition Name, PO Box 275, Beaconsfield NSW 2014. The closing date for entries is 16 January 2002. Winners will be announced in Atomic 14.

Atomic 10 winners: XP Comp: Q. What was the name of Bill Gates' first company and with whom did he found it? A. Lakeside Programmers Group, with Paul Allen. A. Hart, Surrey Hills Vic; D. Gill, Morisset NSW; M. Lyons, Alexandra Hills Qld; C. Pham, Fairfield NSW; P. Tracey, Feilding New Zealand.
Heatsink Comp: Q. How many degrees Celsius (°C) is zero Kelvin and from where does this unit of temperature originate? A. Zero degrees Celsius (0°C) is equal to 273.16 Kelvin. This unit of temperature originated from Sir William Thompson, who later in his brilliant career as a man of science was known as 'Lord Kelvin'. V. Hearne, Wodonga Vic; J. Black, Paramatta NSW

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Notebook Cooling Pad
Dissipates hot air from the bottom layer of notebooks.

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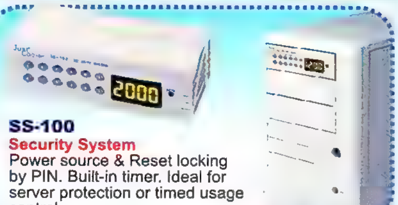

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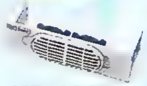

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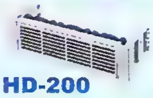

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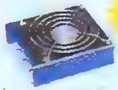

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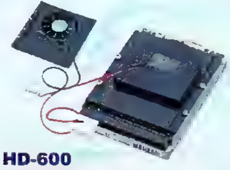

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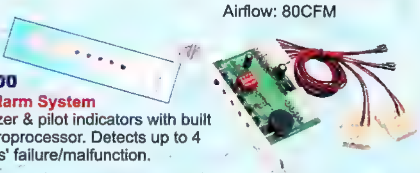

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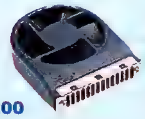

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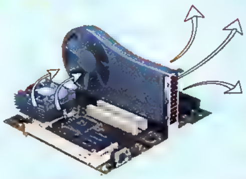

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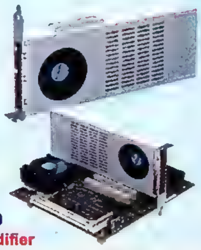

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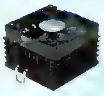
CPU Cooler / Second Fan



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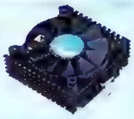

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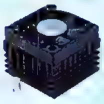

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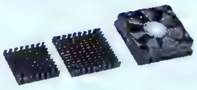

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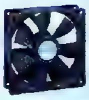
Chipset cooler for AGP cards, mainboards. Adhesive type

CH-420
AGP card chipset cooler (ball bearing) Clip type



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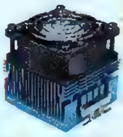

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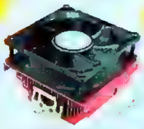

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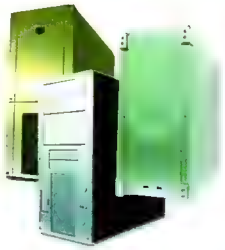

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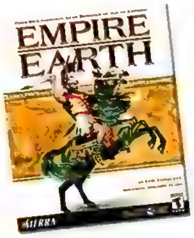

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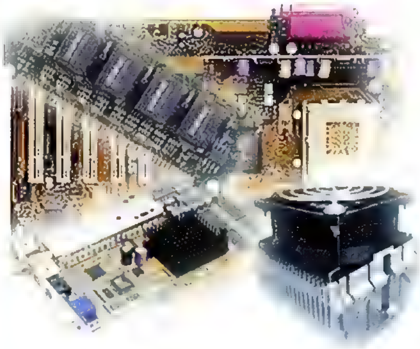

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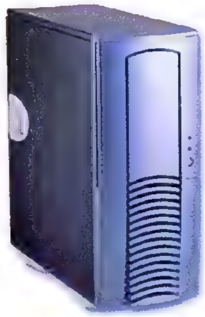

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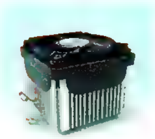

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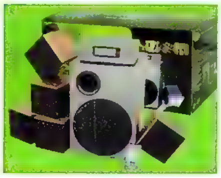

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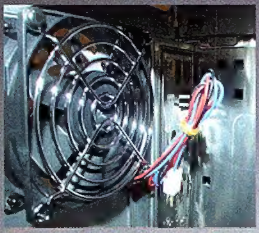
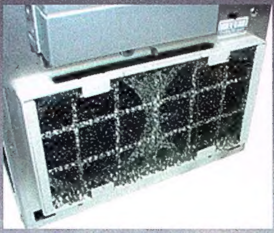

Rear fan cools CPU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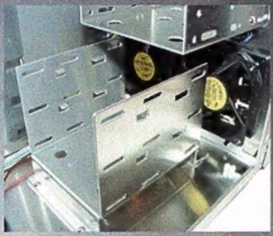
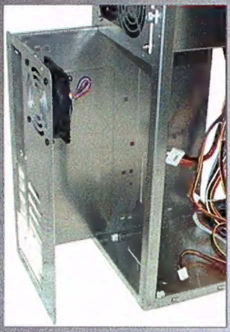

Twin fans cool your drives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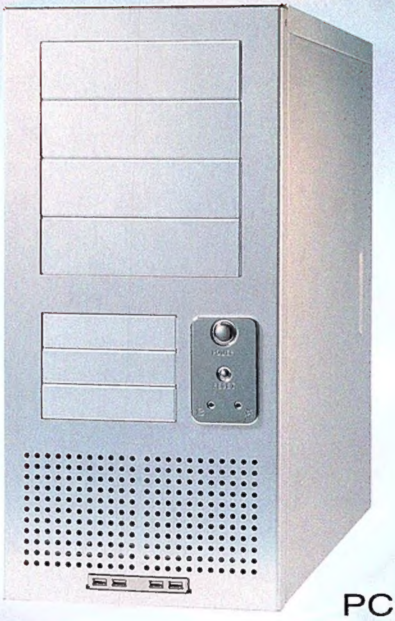
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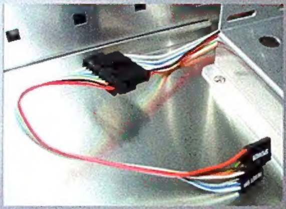
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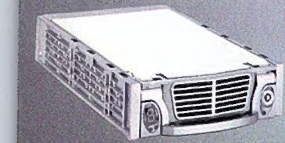
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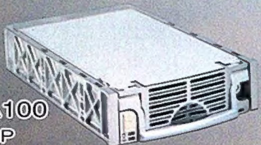
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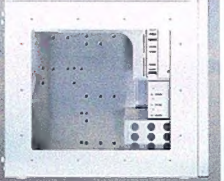
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The future

After 12 issues of Atomic you would think that we would all be sitting back on a beach, relaxing on deckchairs made from leftover motherboards, sipping cocktails chilled inside a frozen Lian Li case and cooking up some snags over a burning GeForce3 card.

Replace 'beach' with 'vacant lot behind the office', 'deckchairs made from leftover motherboards' with 'ground', 'cocktails' with 'Spumante' and 'burning GeForce3 card' with 'microwave' and that vision is spot on. But in our minds we are all in some tropical paradise, relaxing and reflecting.

Given the developments over the past year, the burning question is, 'What do we expect to see from the next one?'. So, we polished up the mystical neon light that doubles for a crystal ball in the Atomic Labs and found some interesting glimpses into the future.

The scariest one is that sometime in the next few months we tip NVIDIA to implode under the weight of its own marketing speak. This should happen during the announcement of the NV25, when the volume of babble will make the announcement last for approximately 13 hours. After about 12 of those hours people will finally realise that a GeForce3 is actually a RIVA 128 with different jargon.

ATI will continue unabated in its plans to have stable drivers for the Radeon series of cards by the end of 2005, STMicroelectronics will bump up the core speed of the KYRO again and call it a KYRO III and Bitboys will actually release a card to the retail market.

A worldwide shortage of perspex will throw the case modding community into uproar. This will lead to a collapse of the motherboard market, as people will no longer impulse buy boards based on the colour of the PCB. The flow-on from this will also be felt by heatsink and neon manufacturers as the major reasons for their existence disappear.

The processor manufacturing world will be rocked by the news that Moore's Law is actually the mission statement of a global conspiracy to slow the CPU market. With these constraints made public, the CPU speed race will re-ignite, and by this time next year we will be running our Athlon XP 9,999,999,999,999,999,999+ and Pentium 4 15THz processors.

A shockwave will roll across the sound card industry when an unnamed company releases a product that successfully employs plug-and-play technology.

Gamers will be shocked at the release of Doom 3. In keeping true to the original, the game will lack mouselook and a jump button, but will feature the best-looking sprites ever seen.

The shocking truth about Duke Nukem Forever (DNF) will also finally come out. Rather than a follow-on from Duke Nukem 3D, DNF is actually the next side-scrolling platform game in the Duke series.

Sometime over the next year a first person shooter will be released that doesn't feature a recreation of the D-Day beach landings. This game will flop badly, as beach assault levels become as integral a part of first person shooters as bunny hopping, rocket jumping and accusing people of cheating.

If you think the past year has been exciting, then you ain't seen nothin' yet. As the sun fades over the 'beach' and the dulcet tones of police sirens start drifting through the balmy summer night, we have seen into the future. And we are excited.

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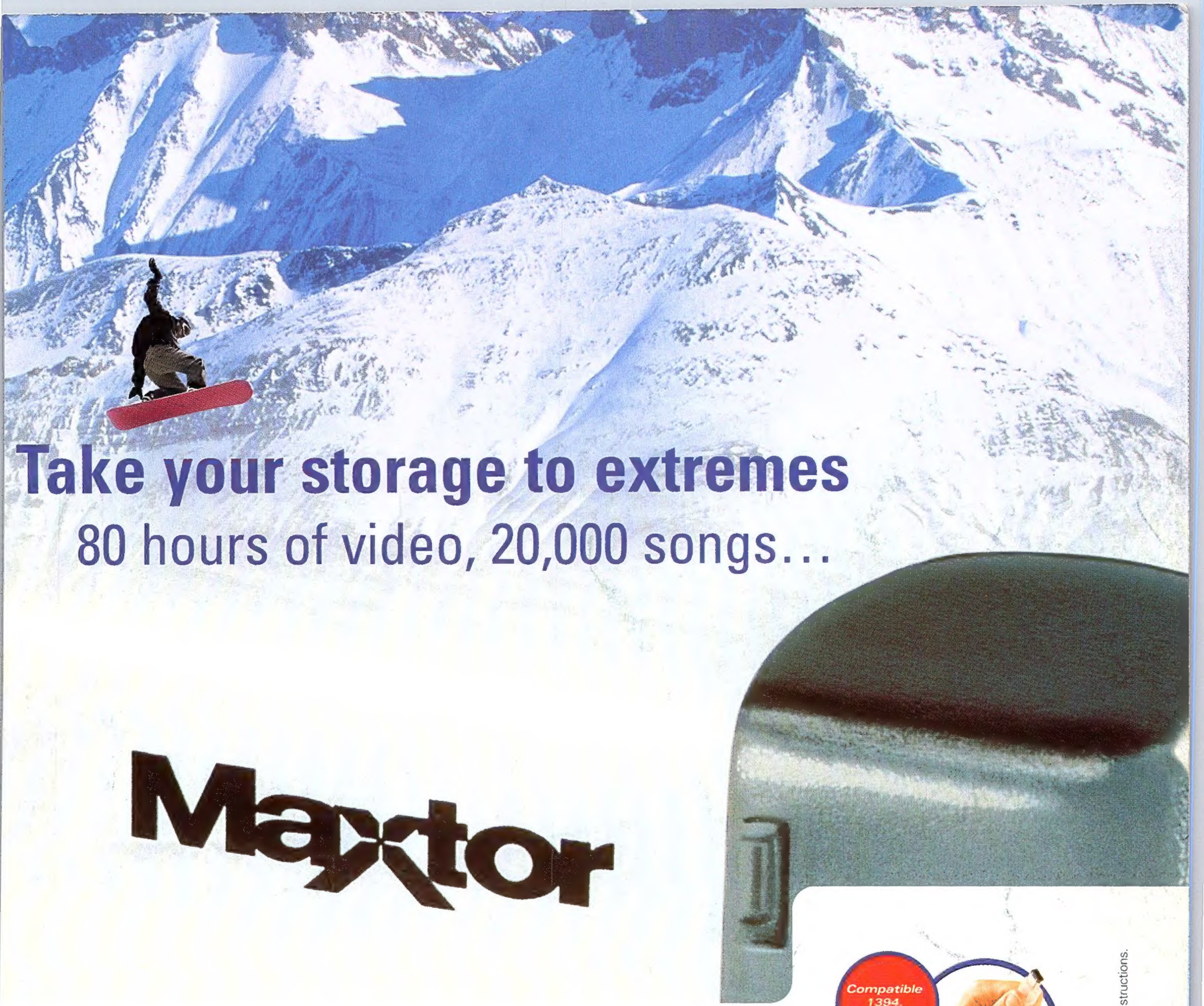

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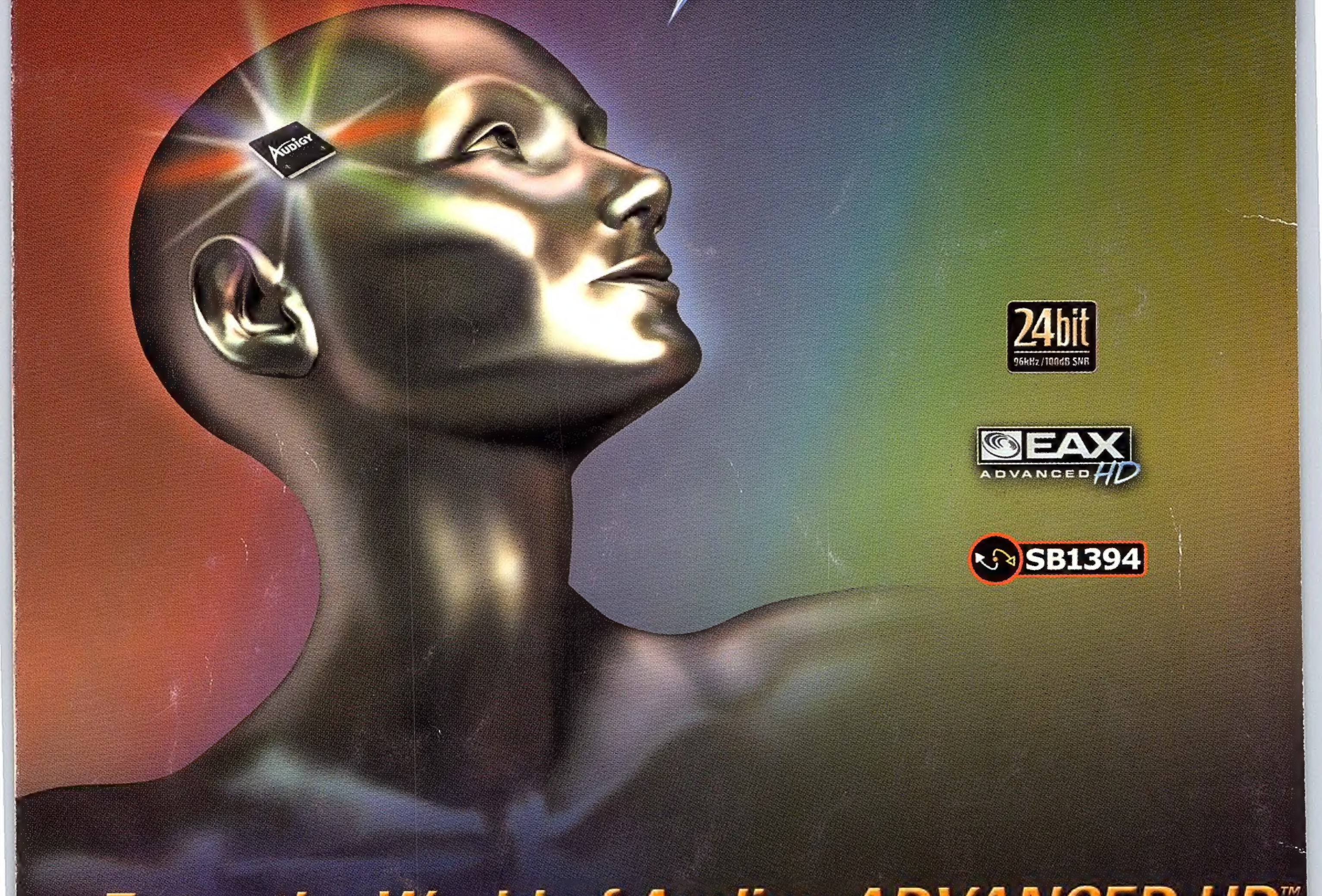

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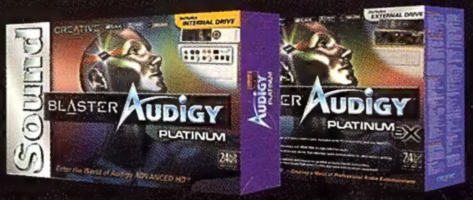

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